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**Metropolitan Life**®
AND AFFILIATED COMPANIES

# SB
# STATISTICAL BULLETIN

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# From the Editor's Desk

In this issue, *SB* invites you to help celebrate the bicentennial of the U.S. Census. Included in our birthday salute are John Long, Chief of the Population Projections Branch, U.S. Census Bureau, who wrote the lead article "Two Hundred Years of Demographic Change: 1790-1990," and Paula Schneider, Chief of the Bureau's Population Division, author of the related Commentary.

## 1990 Census Data

Starting this fall, as the preliminary data from the 1990 Census become available, *SB* will feature them. These analyses will afford early statistical insights into recent key demographic changes. We invite you to follow them on our pages.

## Hepatitis B
## A Public Health Problem

Though it is a far cry from census issues, hepatitis B is a serious viral condition with worldwide distribution affecting over 200 million persons, as well as an important risk factor for liver cancer. During the past 20 years, it has been increasingly recognized as a major public health problem in the U.S.

In this issue, *SB* examines this viral condition using incidence data from the Centers for Disease Control. As we note, an estimated 300,000 new cases occur annually in the U.S., with over 10,000 persons hospitalized. Further, the U.S. currently has an estimated one million chronic carriers of HBV. For more on this communicable disease consult our article, "Hepatitis B in the United States– 1988 Update."

## Accidental Death Toll High

*SB* also examines distribution of accidental deaths and their variation by specific cause, as well as the group at highest risk. Sadly, the toll in life lost from accidental deaths is so high that it touches almost every American at some point in time. One death in 22 in the U.S. each year is the result of an accident. Most disturbingly, they strike young people, accounting for the greatest number of potential-years-of-life-lost (PYLL) under age 65 of all causes of death.

## Personal Health Care Costs

Also in this issue, *SB* publishes the annual estimates of the total cost of personal health care for the previous year developed by the Business Economics Department, MetLife. In 1989 the total cost exceeded a half-trillion dollars–about $536 billion to be exact. As Joseph Vincenzino, Senior Economist at MetLife, reports, the continued growth this past year was in spite of multiple, complex efforts at cost control by government and by the private sector.

## Midwives in the U.S.

Did you think that midwives had disappeared from the U.S. medical care scene? In "Statistical Information, Please," we answer a reader's question about them. You may be surprised to learn of their recent increasing activity level.

With the delivery of that note, I wish you continued good reading. □

Charles B. Arnold

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*The Statistical Bulletin will publish comment and criticism from readers about its contents. Alternate interpretations of data analyses or different points of view about subjects are particularly welcome. Use address at end of publisher's statement, opposite page.*

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# Two Hundred Years of Demographic Change: 1790-1990

For 200 years the censuses of the United States have chronicled the changing demographic condition of the country. April 1, 1990, will see the bicentennial census of the United States. The changes in the nation's population since that first census on August 2, 1790, are immense. A small agricultural, newly-formed nation spread out along the Atlantic seacoast has become a huge industrial giant spanning the continent and extending to Alaska and Hawaii.

April 1, 1990, will see the bicentennial census of the United States.

The current dimensions of this demographic transformation will be known only when the results of the 1990 Census are in– starting in late 1990. We can, however, sketch in the broad outlines of these changes based on data from current surveys, population estimates and projections.

## Population Size

Perhaps the most dramatic change from the first census is the sheer increase in population size. From less than 4 million in 1790, the national population will have grown to around a quarter of a billion by 1990. Table 1 and Figure A present the trend in U.S. decennial population growth.

Perhaps the most dramatic change from the first census is the sheer increase in population size.

From 1790 to 1890, the combination of high fertility and immigration led to an average growth rate of over 30 percent a decade. Declines in fertility during the last 100 years have led to a slowing of the population increase to an average of roughly 15 percent a decade from 1890 through 1990. This growth rate led to a rise in the U.S. population density from 4.5 persons per square mile in 1790 to over 70 persons per square mile in 1990 (despite a fourfold increase in the land area of the country).

## Race and Ethnicity

As befits a nation of immigrants, the U.S. population distribution has reflected changing racial and ethnic distributions. In 1790, the population was a mixture of native and foreign-born individuals that was 19.3 percent black and 80.7 percent white (Table 2). By 1840, the percentage of blacks had declined to 16.8. The black population continued to decline to 11.9 percent by 1890 and to 9.8 percent in 1940. By April 1, 1990, however, the black population will have increased back up to about 12.4 percent of the U.S. total. While the population of races other than white or black was almost negligible in the nation's early years, and was still less than one percent as late as 1940, projections for 1990 indicate that the "other races" population will reach 3.5 percent.

In a similar way, the immigrant population has also fluctuated over the years. As of 1850 foreign-born people represented 9.7 percent of the total population. In the last part of the 19th century and early 20th century, mass migration from Europe led to an increased foreign-born percentage reaching a maximum of 14.7 percent by 1910. Immigration restrictions and the Depression, along with deaths of prior immigrants and growth in the native population, led to a low point of only 4.7 percent foreign-born in 1970. In recent decades, the resumption of

David Johnson

### Table 1—Population Growth of the United States, 1790-1990

| Census Date | Population | Change From Preceding Census | |
|---|---|---|---|
| | | Number | Percent |
| 1990 (Apr. 1) Est. | 250,000,000 | 23,454,195 | 10.4 |
| 1980 (Apr. 1) | 226,545,805 | 23,243,774 | 11.4 |
| 1970 (Apr. 1) | 203,302,031 | 23,978,856 | 13.4 |
| 1960 (Apr. 1) | 179,323,175 | 27,997,377 | 18.5 |
| 1950 (Apr. 1) | 151,325,798 | 19,161,229 | 14.5 |
| 1940 (Apr. 1) | 132,164,569 | 8,961,945 | 7.3 |
| 1930 (Apr. 1) | 123,202,624 | 17,181,087 | 16.2 |
| 1920 (Jan. 1) | 106,021,537 | 13,793,041 | 15.0 |
| 1910 (Apr. 15) | 92,228,496 | 16,016,328 | 21.0 |
| 1900 (June 1) | 76,212,168 | 13,232,402 | 21.0 |
| 1890 (June 1) | 62,979,766 | 12,790,557 | 25.5 |
| 1880 (June 1) | 50,189,209 | 11,630,838 | 30.2 |
| 1870 (June 1) | 38,558,371 | 7,115,050 | 22.6 |
| 1860 (June 1) | 31,443,321 | 8,251,445 | 35.6 |
| 1850 (June 1) | 23,191,876 | 6,122,423 | 35.9 |
| 1840 (June 1) | 17,069,453 | 4,203,433 | 32.7 |
| 1830 (June 1) | 12,866,020 | 3,227,567 | 33.5 |
| 1820 (Aug. 7) | 9,638,453 | 2,398,572 | 33.1 |
| 1810 (Aug. 6) | 7,239,881 | 1,931,398 | 36.4 |
| 1800 (Aug. 4) | 5,308,483 | 1,379,269 | 35.1 |
| 1790 (Aug. 2) | 3,929,214 | . . . | . . . |

Source: Bureau of the Census.

large-scale immigration has reversed the declining size of the foreign-born population. Exact projections of the foreign-born population for 1990 are not available, but current levels of immigration combined with data from the last census would indicate a foreign-born population for 1990 of around 8 or 9 percent of the U.S. total.

## Age Distribution

Figure B presents the trend in the median age of the U.S. population. In 1790, the median age of the population was about 16 years. It rose slowly to 18 years by 1840 and 22 years by 1890. At that date, roughly 38 percent of the population was under 16 while 4 percent was 65 or over. As fertility declined, so did the proportion of children in the population. By 1940, only 27 percent of the population was under 16, 7 percent was 65 and over, and the median age had risen to 29 years. In recent years, improvements in mortality along with renewed fertility decline have accelerated the aging of the population. By April 1, 1990, we expect to see a median age of 33 years with only 23 percent of the population under 16 and more than 12 percentage 65 and over.

At the time of the first census, the pattern of large traditional families common in an agrarian nation resulted in an average household size of 5.79 persons.

**Map 1—Percent Changes State Populations 1790-1840**

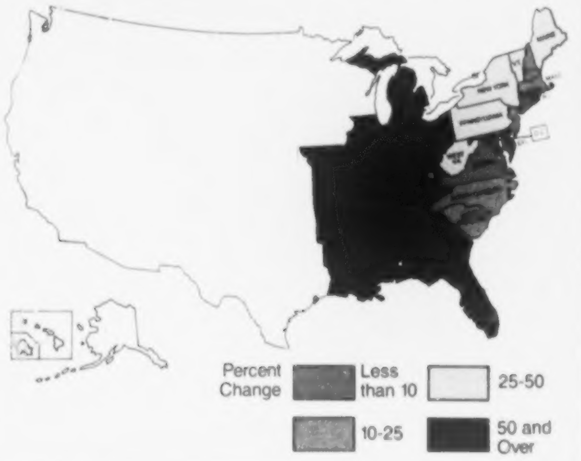
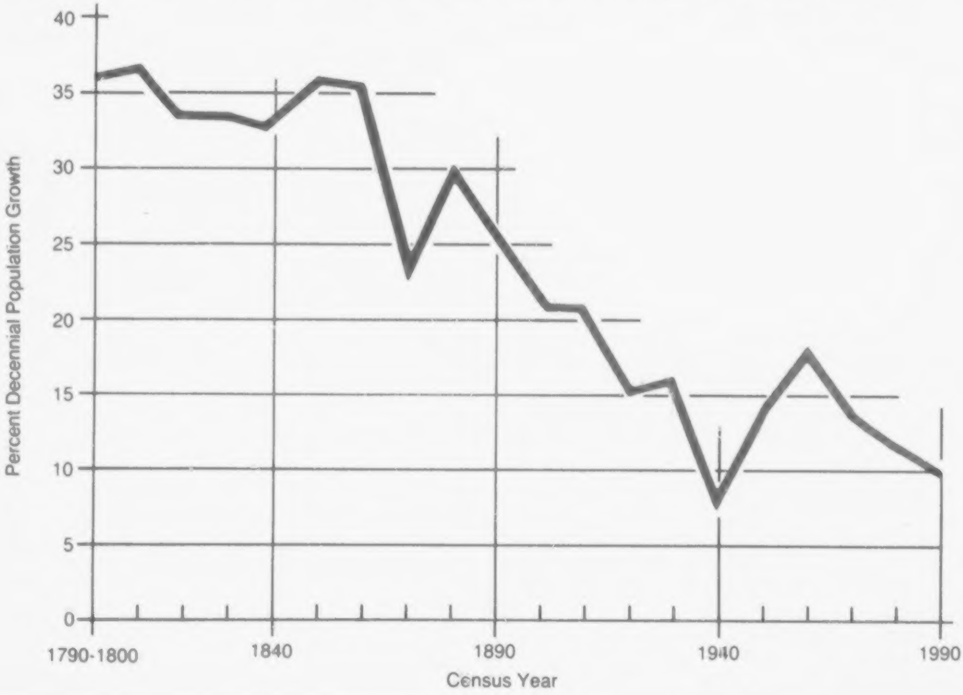


**Figure A—Relative Population Growth of United States, 1790-1990**



## Table 2—Population Distribution of the United States By Race, 1790-1990

| Year | White | Black | Other |
|---|---|---|---|
| 1990 Est. | 84.1 | 12.4 | 3.5 |
| 1980 | 85.9 | 11.8 | 2.3 |
| 1970 | 87.5 | 11.1 | 1.4 |
| 1960 | 88.6 | 10.5 | 0.9 |
| 1950 | 89.5 | 10.0 | 0.5 |
| 1940 | 89.8 | 9.8 | 0.4 |
| 1930 | 89.8 | 9.7 | 0.5 |
| 1920 | 89.7 | 9.9 | 0.4 |
| 1910 | 88.9 | 10.7 | 0.4 |
| 1900 | 87.9 | 11.6 | 0.5 |
| 1890 | 87.5 | 11.9 | 0.6 |
| 1880 | 86.5 | 13.1 | 0.4 |
| 1870 | 87.1 | 12.7 | 0.2 |
| 1860 | 85.6 | 14.1 | 0.3 |
| 1850 | 84.3 | 15.7 | * |
| 1840 | 83.2 | 16.8 | * |
| 1830 | 81.9 | 18.1 | * |
| 1820 | 81.6 | 18.4 | * |
| 1810 | 81.0 | 19.0 | * |
| 1800 | 81.1 | 18.9 | * |
| 1790 | 80.7 | 19.3 | * |

*Less than 0.05 percent.
Source: Bureau of the Census.

In recent years, improvements in mortality along with renewed fertility decline have accelerated the aging of the population. By April 1, 1990, we expect to see a median age of 33 years with only 23 percent of the population under 16 and over 12 percent 65 and over

By 1890, the average household size had dropped somewhat to 4.9 persons. With declines in fertility and thus fewer children in each family, average household size continued to drop to 3.7 by 1940. Since 1940, the increasing number of elderly and the rise in alternative living arrangements have added further to the decline in household size. In 1990, the average household size is expected to be only 2.6 persons.

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### Regional Distribution

The shifting geographic distribution of the resident population over the past two centuries is dramatically shown in Table 3 and Figure C. In 1790, the population was about evenly divided between the Northeast and South. By 1840, settlement of the Midwest had led to its capturing 20 percent of the nation's population with the Northeast and South having roughly 40 percent each.

By 1890, the massive movement of population to settle the frontier area between the Mississippi River and the Pacific Coast led to a substantial shift in the population away from the East Coast. The West had grown enough to encompass 5 percent of the population, and the Midwest had exceeded all the others with 36 percent of the population. The South had declined to roughly 32 percent of the population, while the Northeast represented 28 percent of the national population.

In 1940, 27 percent of the population lived in the Northeast, 30 percent in the Midwest, 32 percent in the South and 11 percent in the West. Continued growth in the Pacific Coast population, combined with slower growth in the Northeastern metropolitan areas between 1940 and 1990, could lead to even further shifts in the population. By 1990, we project that the Northeast (the nation's largest region in 1790) will be the smallest region with 20 percent of the nation's population, surpassed by the West with 21 percent. The South will continue to be the largest region with 35 percent of the population, while the Midwest's proportion will continue to decline to 24 percent.

Map 2—Percent Changes State Populations 1840-1890

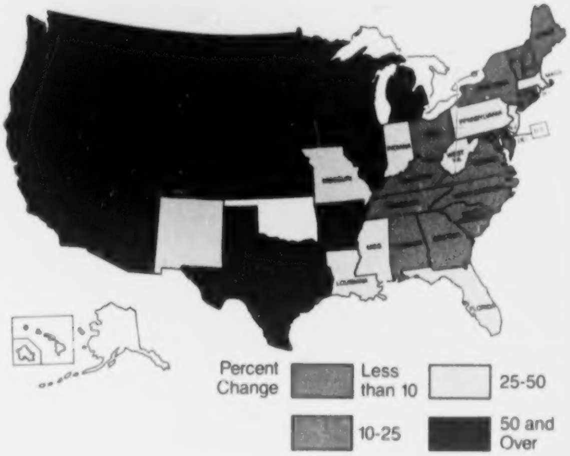
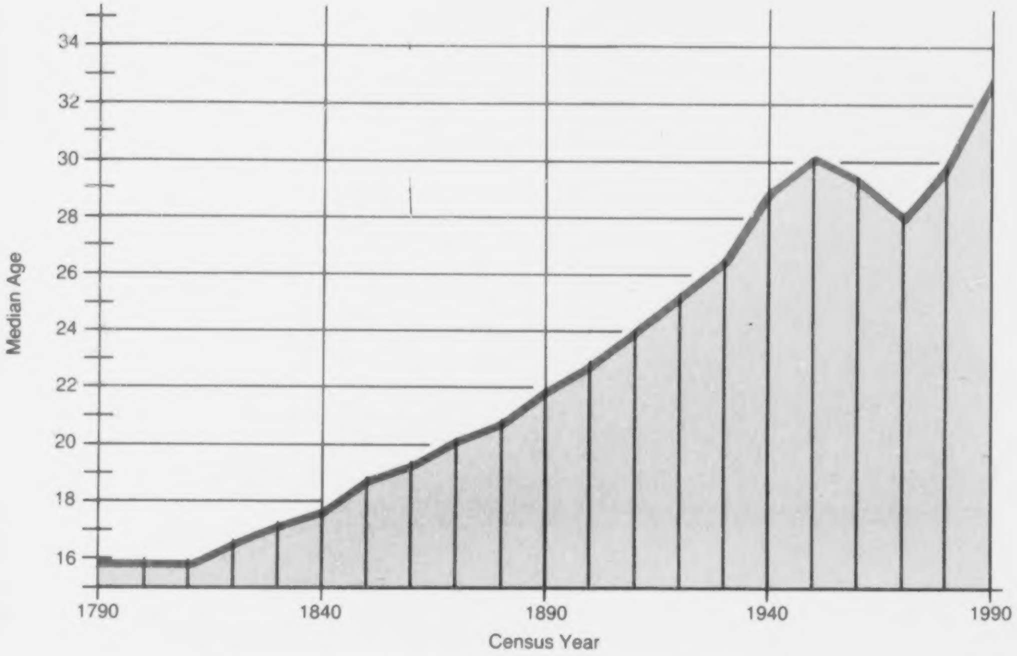


Figure B—Median Age of United States Population, 1790-1990



## Table 3—Regional Distribution of the United States Population 1790-1990

| Year | Percent Distribution | | | |
|---|---|---|---|---|
| | Northeast | Midwest | South | West |
| 1990 Est. | 20.2 | 23.9 | 35.0 | 20.9 |
| 1980 | 21.7 | 26.0 | 33.3 | 19.0 |
| 1970 | 24.1 | 27.9 | 30.9 | 17.1 |
| 1960 | 24.9 | 28.8 | 30.7 | 15.6 |
| 1950 | 26.1 | 29.4 | 31.2 | 13.3 |
| 1940 | 27.2 | 30.4 | 31.5 | 10.9 |
| 1930 | 28.0 | 31.3 | 30.7 | 10.0 |
| 1920 | 28.0 | 32.1 | 31.2 | 8.7 |
| 1910 | 28.0 | 32.4 | 31.9 | 7.7 |
| 1900 | 27.6 | 34.6 | 32.2 | 5.6 |
| 1890 | 27.6 | 35.6 | 31.8 | 5.0 |
| 1880 | 28.9 | 34.6 | 32.9 | 3.6 |
| 1870 | 31.9 | 33.7 | 31.9 | 2.5 |
| 1860 | 33.7 | 28.9 | 35.4 | 2.0 |
| 1850 | 37.2 | 23.3 | 38.7 | 0.8 |
| 1840 | 39.6 | 19.6 | 40.8 | * |
| 1830 | 43.1 | 12.5 | 44.4 | * |
| 1820 | 45.2 | 8.9 | 45.9 | * |
| 1810 | 48.2 | 4.0 | 47.8 | * |
| 1800 | 49.6 | 1.0 | 49.4 | * |
| 1790 | 50.1 | * | 49.9 | * |

*Not applicable.
Source: Bureau of the Census.

By 1990, we project that the Northeast (the nation's largest region in 1790) will be the smallest region with 20 percent of the nation's population, surpassed by the West with 21 percent.

### Center of Population

The impact of the westward movement can be graphically illustrated by the steady march west of the U.S. center of population.[*] Located east of Baltimore in 1790, the population center moved west at an average rate of about 50 miles a decade up to 1890, by which time it was in eastern Indiana, 500 miles due west of its location in 1790. By 1940, the center of population was another 100 miles west and 20 miles south. By 1980, the center of population had crossed the Mississippi River and was at a point in Missouri 760 miles west and 75 miles south of its original location in 1790.

### Differential State Growth Rates

As the nation grew westward, first one tier of states and then another led the nation in the rate of population growth (see Maps 1 through 4). For the first half century, the largest growth rates (more than 50 percent a decade) were concentrated in the states immediately to the west of the original 13 colonies and states along the Mississippi River. From 1840 to 1890, the fastest growing states were west of the Mississippi–from the Great Plains to the Mountain and Pacific states. As the population began to settle down between 1890 and 1940, only the newly homesteaded state of Oklahoma grew at an average rate of 50 percent a decade. At the same time, a pattern of very slow population growth began to set in for a number of states in the heartland and in northern New England.

In the last 50 years, three states (Nevada, Arizona, and Alaska) showed average growth rates of over 50 percent a decade. However, the area of low growth increased dramatically to include most of the Midwest and Northeast states.

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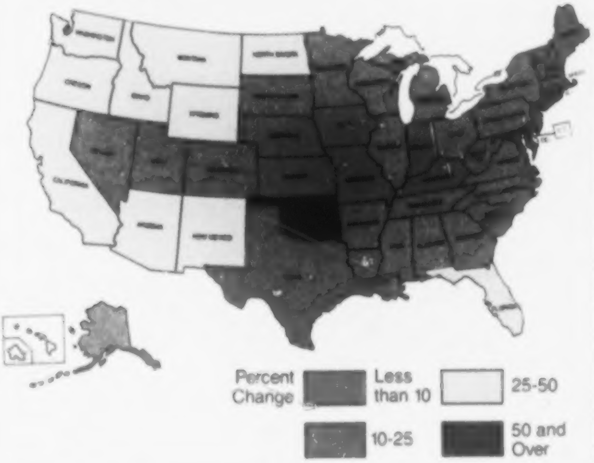
[*] The point upon which the United States would balance, if it were a rigid plane without weight and the population distributed thereon, each individual being assumed to have equal weight and to exert an influence on the central point proportional to his distance from the point.

Map 3—Percent Changes State Populations 1890-1940



## Urbanization

In addition to the westward movement, the other major factor in the redistribution of the American population in the last 200 years is urbanization (Figure D). In 1790, only 5 percent of the population lived in urban areas (places of 2,500 or more population). By 1840, 11 percent of the population did. The next 50 years was a period of marked industrialization of the U.S. population in

Figure C—Regional Distribution of United States Population, 1790-1990

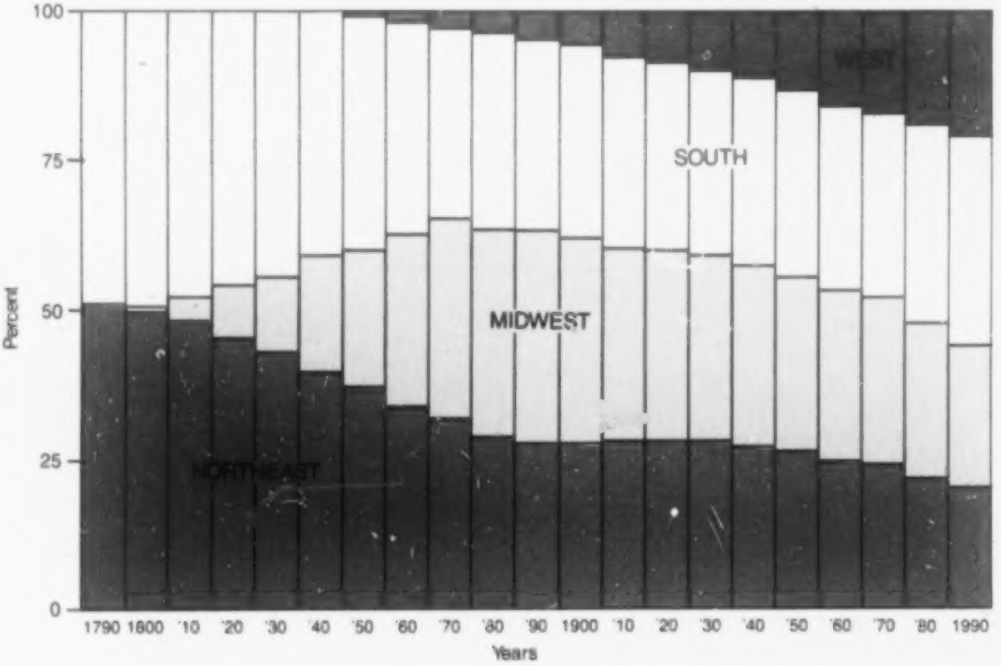
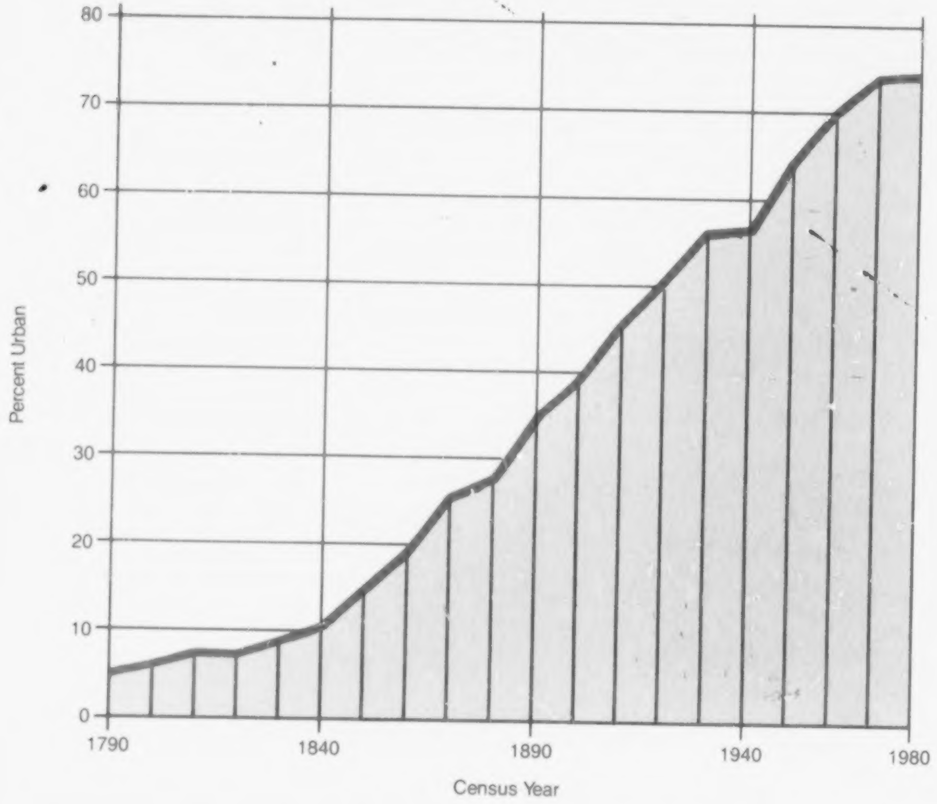


**Figure D—Percent of United States Population Urban, 1790-1980**

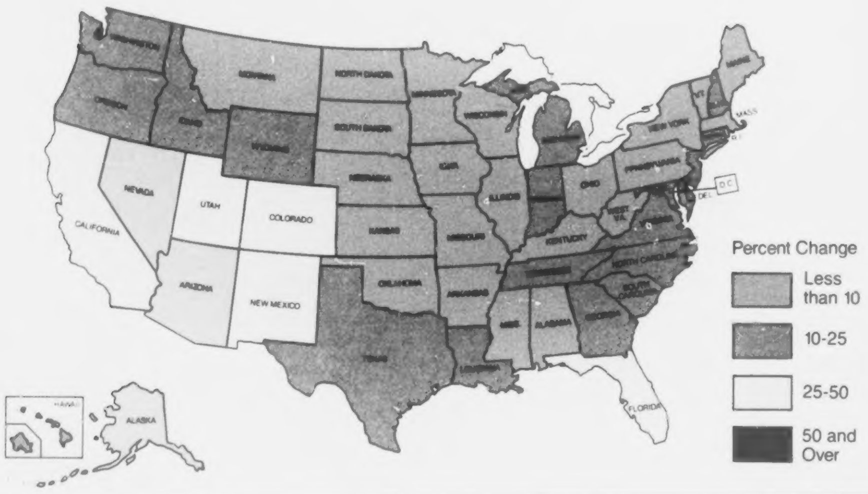


In addition to the westward movement, the other major factor in the redistribution of the American population in the last 200 years is urbanization.

which large portions of the population left agriculture for urban occupations. As a result, the population reached 35 percent urban in 1890. The pace of urbanization increased even more in the 1890 to 1940 period with the urban percentage reaching 56 percent urban by 1940.

By 1940, the spreading of the population beyond urban boundaries was

**Map 4—Percent Changes, State Populations 1940-1990**



beginning to make the urban definition too restrictive. For many purposes, a better concept that incorporates the effects of suburbanization is that of "metropolitan population." In 1940, 48 percent of the U.S. population was metropolitan. By 1987, the percentage metropolitan had risen to 77 percent as the vast majority of employed persons worked in a metropolitan-based industrial and service sector.

## Conclusion

As the nation has changed over the last 200 years, so has the census. While we have followed only those characteristics that have been part of the census for most of its history, the census today covers a much wider range of issues. Not only do we compile statistics on the age, race, and distribution of the population, but we also collect information on housing characteristics, income, occupation, place of work, educational level, ethnicity, employment status, and other social and demographic characteristics.

In this article, we have outlined some of the expected findings of the 1990 Census. However, only when the results are tabulated will we know the exact figures. More importantly, the combination of geographic and characteristic details gained from the census cannot be obtained in any other manner. This is why the census process is so vital and why each of us has a stake in seeing that the census enumeration is a success. As the slogan for the 1990 Census says, "Answer the Census, it counts for more than you think." □

*John F. Long*
*Chief, Population Projections Branch*
*U.S. Bureau of the Census*

# Commentary

## 1990 – Our Bicentennial Census

Every decennial census is a special event, but the 1990 census has added importance in that it represents 200 years of census taking. An overview of some of the significant changes that have taken place in the U.S. are discussed in the article by John Long on page 2. The forthcoming census is the 21st in an uninterrupted series of head counts that began as our country was founded. It is the largest and most complex ever undertaken. The Census Bureau expects to count approximately 250 million people and about 106 million housing units in 1990.

The census is an integral part of our national history. It was part of the great compromise that provided for a bicameral legislative body and allowed for agreement among the various states in the framing of the Constitution. Article I, Section 2 of the Constitution says: "Representatives...shall be apportioned among the several States...according to their respective Numbers...The actual Enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent Term of Ten years..."

The census is one of very few activities that touches every person and housing unit in the nation. It allows each person to report about themselves and, by doing so, to contribute directly to the representational process and to the vast amount of invaluable information each census produces.

### The Process

About a week before Census Day (April 1, 1990) each household will receive a census questionnaire by mail or from a census taker. Most households will receive a short form that asks basic questions on demographic characteristics and on housing. Remaining households– about one in six– will be asked to fill out a longer form with inquiries on social and economic characteristics.

The answers on each questionnaire are stored on computer and combined to produce statistical tabulations for various geographic areas ranging from individual blocks to the nation as a whole. These tabulations, in printed and electronic form, are published and put to thousands of uses.

### The Uses

The population counts for each state are used to determine apportionment– that is, how many seats each state will have in the U.S. House of Representatives. States also use the numbers to redraw boundaries of Congressional districts and state and local legislative districts.

Beyond these basic governmental representation uses there are uncountable ways in which the data are put to use. Billions of dollars in federal funds are returned to states, local governments, and American Indian and Alaska Native areas on the basis of the census's population and housing data. Planners use census facts to assess regional transportation systems, to establish social service programs, to identify areas needing programs to stimulate economic growth, to determine where to locate facilities, and so forth. Various social programs receive funds based on census information, and businesses use the data for decisions involving expansion and jobs. Students use the data to learn about their community, state, and country.

In these many ways, the census touches all of us, both in helping to provide the critical information and in using the results and the knowledge it can provide.□

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***Paula J. Schneider***  
*Chief, Population Division*  
*U.S. Bureau of the Census*

# Hepatitis B in the United States
# 1988 Update

Hepatitis B virus* (HBV) infections are among the leading causes of adult morbidity and mortality throughout the world. More than 200 million persons are infected and in the United States alone, an estimated 300,000 new HBV infections occur annually. Each year in excess of 10,000 HBV infected persons are admitted to U.S. hospitals and further estimates indicate that there are more than one million chronic carriers of the virus across this country.[1-5] Chronic HBV infections are clearly associated with long-term liver diseases (e.g., cirrhosis) and hepatocellular carcinoma during adulthood.[6] HBV infections are serious and often life threatening, but frequently go undetected because at least one-third of all cases have no associated symptoms. It is estimated that in the United States the medical costs of these diseases are at least $1 million a day.[2,3]

The modes of HBV transmission are varied and similar to those for the AIDS virus. That is, risk is increased among persons exposed to infected blood and blood products and/or hypodermic needles, active homosexuals, heterosexuals with multiple partners, persons with multiple bouts of sexually transmitted diseases, and sexual and/or casual contacts with chronic HBV carriers.[7-10] While HBV infections are increasingly being considered young adult, sexually transmitted diseases, children can also be infected. Infected mothers can transmit the virus to their newborns during childbirth and a high proportion of these perinatally transmitted infections result in children who become chronic carriers of HBV.[8]

Currently there is no cure for the acute illnesses associated with HBV nor an accepted treatment to eliminate the chronic-carrier condition. Despite the availability of an effective and safe vaccine for adults, children and infants,[11-15] most immunization programs have focused on certain high-risk groups which constitute only about 5 to 10 percent of acute HBV cases.[4] The high risk groups that account for the vast majority of cases are IV drug users, active homosexual males, and those acquiring the infections through multiple heterosexual exposures.[3] Not only are these groups difficult to identify but they also are hard to locate and/or to persuade to receive the necessary, timely treatment

## OSHA Proposes Hepatitis B Vaccination Standards

The Occupational Safety and Health Administration (OSHA) estimates that there are over 7,000 workplace hepatitis B infections each year in the United States.

Of those infected, 5,500 will go undiagnosed and then act as carriers. The current hepatitis B carrier pool is estimated at one million people.

The proposed OSHA standards would require determination of exposure hazards, establishment and compliance with an infection control plan, training and monitoring of employees, and a hepatitis B vaccination program. Plans are being developed for general vaccination within the next five years.

For more information on hepatitis B, contact the American Liver Foundation, 1425 Pompton Avenue, Cedar Grove, NJ 07009. □

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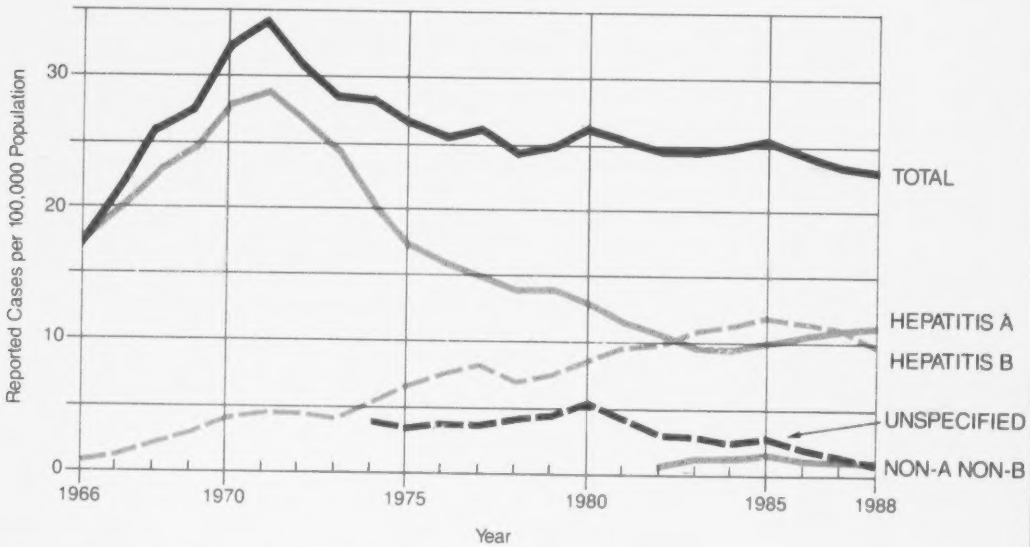
*Hepatitis B is one of several forms of hepatitis, a disease causing inflammation of the liver.

**Figure A—Viral Hepatitis, by Year and Type United States 1966-1988**



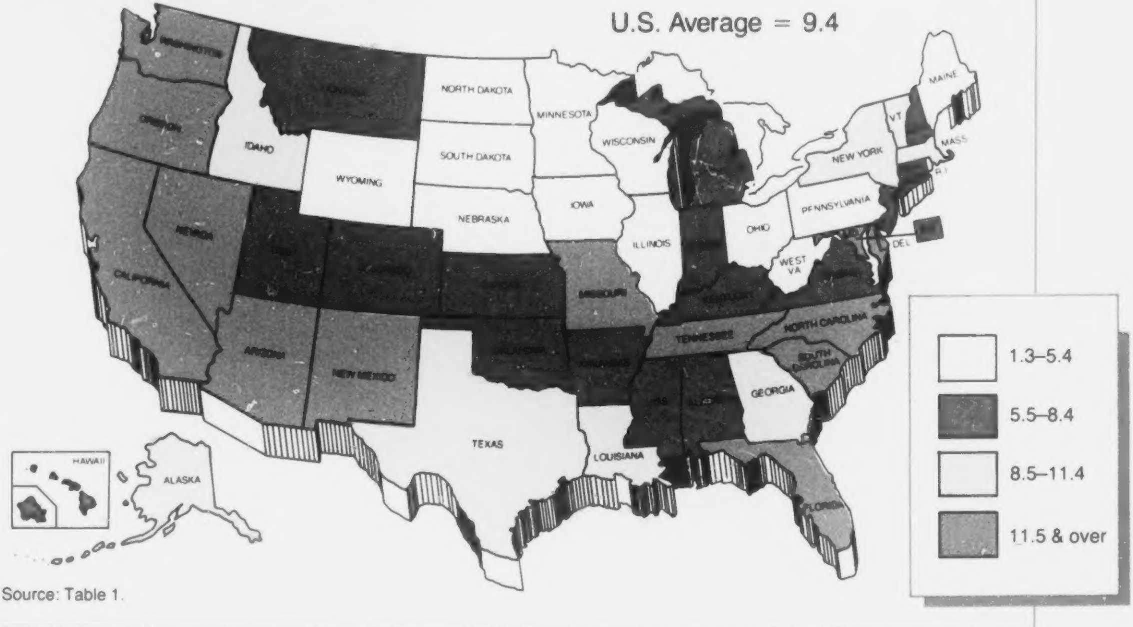
Source: Various reports to the MMWR, supplied by the Centers for Disease Control; 1988 rates computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company.

and follow-up. More comprehensive vaccination programs must be developed along with increased education of health care workers concerning the varying modes of HBV transmission, as well as the identification and recognition of persons with high risk behaviors.[4]

The following data are from two surveillance systems established and run by the Centers for Disease Control (CDC). Incidence data, by age and physician diagnosis of type of hepatitis, are collected from each state by means of the National Morbidity Reporting System; the data are tabulated and reported in the *Morbidity and Mortality Weekly Report* (MMWR). Epidemiologic and serologic risk factor data are obtained through the strictly voluntary Viral Hepatitis Surveillance Program (V[illegible] The information is obtained from case[illegible] records and since 1980 the VHSP ha[illegible] received reports on approximately half of the cases reported to the MMWR.[1] The incidence data reported in this article are provisional for 1988 and risk factor information is that available for 1987 and reported by the Centers for Disease Control (CDC) in 1989. Both sets of data are the most recent and most complete data available even though a substantial amount of under-reporting is acknowledged by all.[16]

Hepatitis B rates exceeded hepatitis A rates between 1983 and 1987

**Figure B—Reported Cases per 100,000 Population of Hepatitis B, by State, 1988**


U.S. Average = 9.4
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
WYOMING
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
MINNESOTA
WISCONSIN
IOWA
MISSOURI
ILLINOIS
TEXAS
LOUISIANA
TENNESSEE
GEORGIA
FLORIDA
OHIO
WEST VA
NORTH CAROLINA
SOUTH CAROLINA
PENNSYLVANIA
NEW YORK
VT
MAINE
MASS
R.I.
DEL
HAWAII
ALASKA
1.3–5.4
5.5–8.4
8.5–11.4
11.5 & over

Source: Table 1.

## Hepatitis B Trends

The two major forms of viral hepatitis have been reported separately to the MMWR since 1966 with further differentiations made in 1974 and 1982 (Figure A). As can be seen, hepatitis A was the predominate form of viral hepatitis through 1982. In 1983 the hepatitis B (HB) rate exceeded that of A by 13 percent and remained the most commonly reported form of the disease through 1987. Provisional data for 1988, however, indicate that the HB incidence and its proportion of the total has dropped slightly and is once again below that of hepatitis A.

Hepatitis B cases continue to concentrate on the two U.S. coasts.

In 1988, 56,773 cases of viral hepatitis were reported in the United States– 41 percent were hepatitis B, 50 percent were hepatitis A. Between 1966 and 1985, rates of hepatitis B increased fairly steadily, reaching a high of 11.5 per 100,000 population. Since 1986* when the rate decreased 3 percent from the previous year, HBV rates have continued to drop. The 1988 provisional rate of 9.4 per 100,000 was 11 percent lower than that reported in 1987 and 16 percent below the 1986 rate.

## Geographic Distribution

The distribution of HBV cases varies extensively by state with high rates continuing to concentrate on the two U.S. coasts (Figure B). That is, rates above the 1988 national average were found in all but Hawaii among the Pacific region states and

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*1985 and 1986 data exclude New York City

## Table 1—Reported Cases of Hepatitis B United States, 1988

| | Number of Cases* | Rate per 100,000 | Percent Difference from U.S. Average |
|---|---|---|---|
| UNITED STATES | 23,177 | **9.4** | — |
| New England | 1,166 | **9.0** | –4.3 |
| Maine | 56 | **4.6** | –51.1 |
| New Hampshire | 64 | **5.9** | –37.2 |
| Vermont | 60 | **10.8** | 14.9 |
| Massachusetts | 649 | **11.0** | 17.0 |
| Rhode Island | 86 | **8.7** | –7.4 |
| Connecticut | 251 | **7.8** | –17.0 |
| Middle Atlantic | 3,144 | **8.4** | –10.6 |
| New York | 2,004 | **11.2** | 19.1 |
| New Jersey | 497 | **6.4** | –31.9 |
| Pennsylvania | 643 | **5.4** | –42.6 |
| East North Central | 2,392 | **5.7** | –39.4 |
| Ohio | 557 | **5.1** | –45.7 |
| Indiana | 356 | **6.4** | –31.9 |
| Illinois | 585 | **5.0** | –46.8 |
| Michigan | 671 | **7.3** | –22.3 |
| Wisconsin | 223 | **4.6** | –51.1 |
| West North Central | 1,113 | **6.3** | –33.0 |
| Minnesota | 156 | **3.6** | –61.7 |
| Iowa | 84 | **3.0** | –68.1 |
| Missouri | 639 | **12.4** | 31.9 |
| North Dakota | 19 | **2.8** | –70.2 |
| South Dakota | 9 | **1.3** | –86.2 |
| Nebraska | 47 | **2.9** | –69.1 |
| Kansas | 159 | **6.4** | –31.9 |
| South Atlantic | 4,876 | **11.5** | 22.3 |
| Delaware | 137 | **20.8** | 121.3 |
| Maryland | 691 | **15.0** | 59.6 |
| District of Columbia | 51 | **8.3** | –11.7 |
| Virginia | 343 | **5.7** | –39.4 |
| West Virginia | 73 | **3.9** | –58.5 |
| North Carolina | 848 | **13.1** | 39.4 |
| South Carolina | 537 | **15.5** | 64.9 |
| Georgia | 716 | **11.3** | 20.2 |
| Florida | 1,480 | **12.0** | 27.7 |
| East South Central | 1,399 | **9.1** | –3.2 |
| Kentucky | 229 | **6.1** | –35.1 |
| Tennessee | 631 | **12.9** | 37.2 |
| Alabama | 330 | **8.0** | –14.9 |
| Mississippi | 209 | **8.0** | –14.9 |
| West South Central | 2,428 | **9.0** | –4.3 |
| Arkansas | 138 | **5.8** | –38.3 |
| Louisiana | 427 | **9.7** | 3.2 |
| Oklahoma | 209 | **6.4** | –31.9 |
| Texas | 1,654 | **9.8** | 4.3 |
| Mountain | 1,603 | **12.0** | 27.7 |
| Montana | 55 | **6.8** | –27.7 |
| Idaho | 114 | **11.4** | 21.3 |
| Wyoming | 12 | **2.5** | –73.4 |
| Colorado | 205 | **6.2** | –34.0 |
| New Mexico | 229 | **15.2** | 61.7 |
| Arizona | 633 | **18.1** | 92.6 |
| Utah | 137 | **8.1** | –13.8 |
| Nevada | 218 | **20.7** | 120.2 |
| Pacific | 5,056 | **13.5** | 43.6 |
| Washington | 974 | **21.0** | 123.4 |
| Oregon | 611 | **22.1** | 135.1 |
| California | 3,351 | **11.8** | 25.5 |
| Alaska | 53 | **10.1** | 7.4 |
| Hawaii | 67 | **6.1** | –35.1 |

*Unpublished provisional data.
Source: Rates computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on data from the Centers for Disease Control and the Bureau of the Census.

in six of the nine states in the South Atlantic region. Rates more than twice the average were found in Oregon, Washington, Delaware and Nevada.

The lowest rates of hepatitis B were found in the center of the country. The states in the East North Central region reported average rates almost 40 percent below the total United States. The West North Central region averaged the second lowest with a rate 33 percent below the norm. With the exception of Missouri where the rate was 32 percent *above* the average, each state within this region reported fewer than 200 HBV cases and rates well below the total for the country.

Among states with at least 200 reported cases, HB rates differed by more than 340 percent (Table 1). For example, Illinois reported 585 cases and a rate of 5.0 per 100,000 population. Oregon, at the other end of the spectrum, reported 611 cases and a rate of 22.1– 342 percent higher than the Illinois rate.

## Demographic Characteristics

By presenting demographic and epidemiologic data from the VHSP for selected years through 1987, Tables 2 and 3 provide a profile of individuals at high risk of acquiring hepatitis B. Despite the fact that these data represent only about 46 percent of the cases reported to MMWR, they are useful for descriptive purposes as well as for documenting trends.[1] Marked racial differences exist in estimates of the prevalence of HBV infections. Serologic markers were found in 13.7 percent of black participants in the 1976-1980 National Health and Nutrition Examination

Hepatitis B occurs 1.5 times more frequently among men than women.

Survey versus 3.2 percent in white participants.[17]

Hepatitis B incidence continues to be more pronounced among white, young adult males (Table 2). Almost three-fourths of all cases were among persons between the ages of 20 and 39 with 65 percent of these being in their 20s. The disease occurs one and one-half times more frequently among men than women. More than three out of every five cases are diagnosed in whites. In 1987, whites and blacks, together, accounted for 82 percent of the total hepatitis B cases in this country. Around 7 percent of all cases occurred in Hispanics and the remaining 11 percent occurred in persons of other or unknown ethnic origins. While on average around 20 percent of the 1987 HB cases were found in blacks, hepatitis B is the most common form of viral hepatitis reported within this population. The CDC reports that 72 percent of all viral hepatitis cases among blacks is hepatitis B, whereas it accounts for 37 percent among whites, 38 percent among Hispanics, 32 percent among others and 41 percent among persons of unknown ethnicity (data not shown).[1]

More than 60 percent of hepatitis B cases occur among whites.

## Reported Risk Factors

Parenteral drug use predominates among the risk factors reported by patients as the source of their HB infection (Table 3). Not only has this behavior remained the most frequently reported source of infection but its importance is growing. Since 1984 there has been a 42 percent increase in the proportion of patients reporting drug use in connection with their illness. This behavior is most frequently reported by 15-39 year olds.

### Table 2—Percentage Distribution of Hepatitis B, by Age, Sex and Ethnicity United States, 1985 and 1987

| Characteristics | 1985 | 1987 |
|---|---|---|
| **Age (Years)** | | |
| Total* | (10,369) | (9,524) |
| <5 | .4 | .4 |
| 5-9 | .3 | .4 |
| 10-14 | .7 | .7 |
| 15-19 | 8.8 | 8.9 |
| 20-29 | 48.4 | 46.5 |
| 30-39 | 21.8 | 24.8 |
| 40-49 | 7.8 | 8.4 |
| 50-59 | 4.8 | 4.5 |
| 60 + | 5.8 | 4.7 |
| Unknown | 1.4 | 1.0 |
| **Sex** | | |
| Male | 60.7 | 59.7 |
| Female | 37.4 | 38.6 |
| Unknown | 1.9 | 1.7 |
| **Ethnic Group** | | |
| White | 66.1 | 62.4 |
| Black | 18.4 | 19.9 |
| Hispanic | 4.7 | 7.1 |
| Other | 2.9 | 2.6 |
| Unknown | 7.9 | 8.0 |

*Includes unknown, not distributed by age, sex or ethnic group.
Source: Various Hepatitis Surveillance Reports from the Centers for Disease Control.

Since 1984 there has been a 42 percent increase in the proportion of patients reporting drug use as a risk factor associated with their disease.

Contact with an HB-infected person continues to be the second most commonly reported source of infection for all patients. It should be noted, however, that the CDC cautions that this category may be

## Table 3—Selected Mutually Exclusive* Characteristics Reported by Patients with Hepatitis B, United States, 1984-1987

| Characteristics | 1984 | 1985 | 1987 | | | |
|---|---|---|---|---|---|---|
| | | | | Percent of Patients by Age | | |
| | Total† (8,964) | Total† (10,369) | Total† (9,524) | <15 (136) | 15-39 (7,632) | 40+ (1,665) |
| Blood transfusion | 3.1 | 3.2 | 1.4 | 1.7 | .8 | 4.2 |
| Drug use | 17.2 | 19.3 | 24.4 | 4.3 | 28.7 | 6.5 |
| Homosexual activity | 9.4 | 8.3 | 6.6 | .9 | 7.4 | 3.4 |
| Medical/dental employment | 5.5 | 5.6 | 4.2 | ‡ | 3.8 | 6.2 |
| Hemodialysis-associated | .6 | .6 | .7 | 2.5 | .4 | 1.8 |
| Personal contact with hepatitis B | 10.3 | 12.1 | 12.9 | 31.1 | 13.3 | 9.4 |
| Unknown | 53.9 | 50.9 | 49.8 | 59.5 | 45.6 | 68.5 |

*In decreasing order of exclusion.
†Number includes ages unknown.
‡Less than 0.05.
Source: Various Hepatitis Surveillance Reports from the Centers for Disease Control.

overestimated because the "type of contact is not specified."[1] While the frequency of reported personal contact decreases with age, it is the leading source of infection among patients under age 15 as well as those 40 years old or older. The overall frequency of this risk factor is seen to have increased 25 percent since 1984.

Homosexual activity was reported by 6.6 percent of patients in 1987--a proportion which has *decreased* some 30 percent since 1984. This decrease has been observed elsewhere and is a probable reflection of changes in high-risk sexual behaviors undertaken to help prevent AIDS infection. Health care employment (medical and/or dental) was reported by 4.2 percent of all HB patients in 1987– the frequency of this risk factor is obviously age-dependent. Between 1984 and 1987, the reporting of this source of infection decreased in relative importance by 24 percent. This decrease reflects increased screening and vaccination among health care workers who historically have been recognized as being at high risk of acquiring hepatitis B infection.

According to the CDC, the trends seen through 1987 appear to be continuing. That is, there is little or no change in the demographic composition of HB patients. HB infections among homosexuals and health care workers continue to decline and these infections appear to be plateauing among drug users while possibly increasing among active heterosexual males.[18]

## Public Health Issue

Nationwide, hepatitis B and its sequelae continue to be of major public health concern. HB prevention and control efforts have met with some success, particularly among historically high-risk groups such as health care workers, dialysis patients, residents and staff in homes for the mentally handicapped, etc. Nonetheless, evidence is increasingly implicating additional groups at high risk of HBV infection and transmission– most recently, newborn children of Southeast Asian immigrants. It is, therefore, incumbent upon the public health and medical professions to reassess prevention plans and to consider different vaccination strategies in an effort to better control the incidence of HBV infections in this country. Whether it will be necessary to devise a system for the routine immunization of infants and adolescents remains to be determined.[20] Until changes are made, however, state and local health departments must continue their surveillance activities so as to document additional modes of transmission and to identify high-risk individuals. Armed with such data, educated decisions about primary prevention practices can be made.□

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# Capsule Briefs

## are timely selections with broad reader interest

## Good Friends and Good Health Go Together

Increasingly in recent years there have been studies showing that social isolation among older men is associated with increased sickness and higher death rates. In a social-medical scientific study of 500 interviewed men born in 1914, residing in Malmo, Sweden, it was found that those with low availability of social networks and social support systems had a significantly higher chance of dying during a 1982-87 follow-up period. The results persisted when several likely conflicting variables were controlled. (Hanson, B.S., Isacsson, S., Janzon, L. and Lindell, S., **Am J Epidemiology** 1989, 130:100-11.) ☐

## Cancer Vaccines Show Promise

Because a cancer is a foreign, bodily tissue, the immune system should recognize, kill and remove it. For reasons not entirely understood, that happens only rarely, but researchers report recent results with vaccines to achieve immune recognition and action that are discussed in this fascinating review. Included is information about several current investigations, their cancer sites, and the immunological methods under study. While patients today may not benefit, the odds are increasing that future generations will have the burden of certain cancers lifted. (Marx, J., **Science** 1989, 245:813-815.) ☐

## Excessive Ultraviolet Radiation Not Fit for Human Skin

It is official now. That golden summer tan *is* unhealthy. In this comprehensive review, the American Medical Association's Council on Scientific Affairs documents authoritatively that excessive ultraviolet light is harmful to one's health, causing not only sunburn but also premature skin aging, carcinogenesis, eye damage, decreased immune system responsiveness, as well as phototoxicity. So, remember their advice next winter vacation: cover up well, and return frequently to warmer weather in good health. (Council Report, **JAMA** 1989, 262(3):380-384.) ☐

## Does Your Typist Have a Chronically Sore Wrist?

If so, the problem may be carpal tunnel syndrome, an occupational condition not only among typists, but also prevalent among garment workers, butchers, grocery checkers, musicians, packers, housekeepers/cooks, and carpenters. It is caused by scarring around the median nerve in the wrist as it passes through the carpal tunnel, a fibrous,normally-protective, tissue. This brief, but thorough, review will be helpful for employers wishing more information on this irksome condition. (**Morbidity and Mortality Weekly Report** 1989, 38(28):485-489.) ☐

## My Daughter, the Doctor...

A quiet gender revolution has taken place in medical education. Women now represent 37 percent of medical school applicants, 34 percent of the students, 28 percent of the residents, and 19 percent of school faculty members. These numbers represent substantial increases over the past 10 years. The gains are not without some pain, however. In a profession that continues to be male dominated, women experience more stress than men in the system. Women's choices of specialty are also more limited, and their accession to senior faculty positions has not kept pace with their numbers. When all this is more widely known, perhaps feminists will have a new target. (Bickel, J., **New England J Medicine** 1988, 319:1579-84.) □

## Dare We Acknowledge It?

Probably all parents would prefer to believe that sex life among college students is virtually nonexistent. For the American College Health Association's members, and school physicians, the problem is real, up-front and personal. Whereas formerly, unintentional pregnancy and the occasional sexually transmitted disease (STD) were the major concerns, the new wave of STDs, the sexual aspects of cancer risk, AIDS, and acquaintance-rape have changed all that. This entire journal issue is devoted to the description of the problems and suggested management of these clinical and social problems. If you are the parent of a college student, you may wish to read this one. (**J Amer College Health** 1989, 37(6):245-303.) □

## Adult Day Care

Almost imperceptibly a new service industry is arising in the U.S.: day care for impaired, mostly elderly adults, who live with children or relatives. In this brief, but thorough and informative review, the authors trace the development of adult day care, indicate its place in modern society, and discuss some of its likely near future developments, including financing. (Wolf-Klein, G.P., Maar, V.K., and Foley, C.J., **New York State Med J** 1988; 88 (10):528-530.) □

## Too Much of a Good Thing

There is an adage in medicine, "Never let the perfect stand in the way of doing the good," that now applies to hypertension treatment. In this study, confirming earlier ones, investigators found that heart attack deaths occurred more frequently than expected when physicians lowered a person's blood pressure too much in treatment. Since under-treated hypertension is also unhealthy, a question can be raised: Which is worse, the treatment or the disease? (Alderman, M.H., Ooi, W.L., Madhavan, S. and Cohen, H., **JAMA** 1989, 262(7):920-924.) □

# Mortality From Leading Types of Accidents 1976-77 and 1986-87

Accidents* account for approximately 96,000 deaths each year in the United States.[1] For the total U.S. population at all ages combined, accidental fatalities are exceeded only by those from major cardiovascular diseases and cancer. Among children and young adults, however, accidents are the *leading* cause of death. Since accidents generally claim younger lives than those associated with the other major leading causes of death, years of potential lives lost are greater for accidental fatalities; annually more than four million potential years of life are lost due to such injuries.[2]

Annually more than four million potential years of life are lost due to accidents.

The number of deaths from home, work, public or motor vehicle accidents was approximately 2 percent higher in 1988 than in the previous year. This high of 96,000 fatalities reflects substantial increases in accidental home deaths which were not offset by the reported decrease in accidental work or other deaths (Table 1). The mortality *rate* for all accidents was 39.1 per 100,000 population, up 1 percent from the 1987 rate. While these totals were higher than those in the previous year, 1988 was the seventh straight year in which the National Safety Council reported accidental deaths fewer than 100,000.[1]

While the societal costs (direct and indirect) associated with accidental deaths are difficult to measure, they are considered enormous and growing. The costs of accidents in which deaths or disabling injuries occurred were estimated to be at least $143.4 billion in 1988, a sum almost 8 percent higher than the costs in 1987 (Table 1). Motor vehicle accidents accounted for almost half of this amount ($70.2 billion) and work accidents about a third ($47.1 billion). It is estimated that, on average, there are 11 fatalities from accidents every hour in this country, and approximately 1,040 accident-caused disabling injuries. The costs associated with these accidents total approximately $16,000,000.[1]

Using data from the National Center for Health Statistics (NCHS), Table 2 presents average mortality rates for the leading types of accidents by age and sex for 1986-87. The 1987 statistics are the most recent, detailed, final U.S. data available for analyses.[3] These data were combined with 1986 NCHS data and average rates computed in an effort to offset possible unusual fluctuations in accidental deaths during any one specific year. Calculations of the percentage change between these data and those a decade earlier are presented to document progress that is being made and to demonstrate areas in need of increased surveillance.

## Accidental Mortality by Type, Age and Sex

The relative mortality from specific types of accidents varies at different periods of life with the rates consistently higher among

Accident mortality is higher among men than women in all age groups.

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*Accidental deaths refer to most of those from violence; excluded are deaths from homicides, suicides, war operations and those fatalities for which none of the categories can be determined.

## Table 1—1987 and 1988 Accidental Deaths by Class Estimates of Selected Costs of Accidents, 1988 ($ billions) and Percent Change From 1987 Costs

| | Total[a] | Motor Vehicle | Work | Home | Public Non-Motor Vehicle |
|---|---|---|---|---|---|
| **Deaths** | | | | | |
| 1988 | 96,000 | 49,000 | 10,600 | 22,500 | 18,000 |
| 1987 | 94,500 | 48,500 | 11,150 | 21,500 | 7,500 |

**Selected 1988 Costs* and Percent Change, 1987 to 1988**

| | Total[a] | Motor Vehicle | Work | Home | Public Non-Motor Vehicle |
|---|---|---|---|---|---|
| Total Costs | $143.4 | $70.2 | $47.1 | $17.4 | $10.9 |
| % change | +7.7% | +8.5% | +11.1% | +4.2% | -5.2% |
| Wage loss | 37.1 | 20.3 | 7.9 | 5.8 | 4.7 |
| % change | +7.2 | +8.0 | +3.9 | +16.0 | +2.1 |
| Medical expense | 23.6 | 5.0 | 8.1 | 6.7 | 4.4 |
| % change | +1.7 | +8.7 | +20.9 | +7.5 | +10.6 |
| Insurance administration[b] | 28.7 | 21.3 | 6.0 | .8 | .6 |
| % change | +4.0 | +3.4 | +3.4 | +14.3 | +20.0 |
| Fire loss | 8.4 | (c) | 3.1 | 4.1 | 1.2 |
| % change | +20.0 | | +40.9 | +7.9 | +20.0 |
| Motor-vehicle property damage | 23.6 | 23.6 | (c) | (c) | (c) |
| % change | +14.0 | +14.0 | | | |
| Indirect work loss | 22.0 | (c) | 22.0 | (c) | (c) |
| % change | +9.5 | | +9.5 | | |

[a] Duplications between work and motor vehicle, and home and motor vehicle are eliminated in totals.

[b] Home and public insurance administration costs may include costs of administering medical treatment claims for some motor vehicle injuries filed through health plans.

[c] Not included.

* Includes deaths and disabling injuries.

Source: National Safety Council, *Accident Facts* reports 1988 and 1989, Chicago.

men than women (Table 2). The 1986-87 death rate from all accidents was 55.3 per 100,000 among men of all ages, combined– more than double the rate reported among women (24.1). The male dominance holds across all age groups but the differential is the greatest for men in their 20s where their rate is close to 4 times that among same-aged women. Accidents claimed more lives among males aged 5 to 14 and 15 to 19 than did all the other causes of death combined. For young women, such was the case only among those aged 15 to 19, although accidents remained the leading cause of these deaths among females.

# Table 2—Mortality From Leading Types of Accidents by Age and Sex, United States, 1986-87

| Type of Accidents | Death Rate per 100,000 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | All Ages* | 1-4 | 5-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-44 | 45-54 | 55-64 | 65+ |
| **MALE** | | | | | | | | | | | |
| Accidents—All Types | **55.3** | 24.0 | 16.7 | 68.5 | 83.6 | 66.4 | 56.9 | 49.0 | 46.2 | 51.6 | 108.6 |
| Motor vehicle | **28.8** | 7.7 | 9.0 | 51.9 | 61.5 | 42.3 | 31.9 | 25.2 | 21.9 | 21.4 | 31.4 |
| Traffic | **28.2** | 6.4 | 8.5 | 51.1 | 60.6 | 41.6 | 31.3 | 24.7 | 21.4 | 20.9 | 30.7 |
| Pedestrian | **4.2** | 2.9 | 2.9 | 3.4 | 4.9 | 4.3 | 3.7 | 3.8 | 4.3 | 4.5 | 7.7 |
| Nontraffic | **.6** | 1.2 | .5 | .8 | .9 | .7 | .6 | .5 | .5 | .5 | .7 |
| Falls | **5.2** | .6 | .3 | 1.1 | 2.0 | 2.0 | 2.3 | 2.7 | 3.8 | 6.6 | 30.6 |
| Drowning† | **3.1** | 5.9 | 2.6 | 5.2 | 4.7 | 3.7 | 2.9 | 2.2 | 1.9 | 1.7 | 2.2 |
| Poisoning by solids and liquids | **2.7** | .3 | .1 | .8 | 2.4 | 5.3 | 6.8 | 5.2 | 2.3 | 1.7 | 2.2 |
| Fires and flames | **2.5** | 5.4 | 1.4 | .9 | 1.6 | 1.7 | 1.7 | 1.8 | 2.3 | 3.0 | 6.3 |
| Inhalation and ingestion of food or other object | **1.7** | 1.0 | .1 | .2 | .3 | .4 | .4 | .7 | 1.2 | 2.3 | 9.7 |
| Accidental deaths as a percentage of all deaths | **6** | **42** | **53** | **56** | **48** | **37** | **27** | **17** | **7** | **3** | **2** |
| Motor vehicle accident deaths as a percentage of all accidental deaths | **52** | **32** | **54** | **76** | **74** | **64** | **56** | **51** | **47** | **41** | **29** |
| **FEMALE** | | | | | | | | | | | |
| Accidents—All Types | **24.1** | 16.4 | 7.8 | 25.2 | 21.5 | 17.2 | 14.9 | 14.3 | 15.4 | 20.5 | 71.2 |
| Motor vehicle | **11.3** | 6.1 | 4.9 | 22.0 | 17.4 | 12.5 | 9.8 | 9.0 | 8.9 | 10.0 | 16.2 |
| Traffic | **11.1** | 5.3 | 4.7 | 21.8 | 17.3 | 12.4 | 9.7 | 8.9 | 8.8 | 9.9 | 15.9 |
| Pedestrian | **1.7** | 1.7 | 1.6 | 1.5 | 1.2 | 1.3 | 1.1 | 1.1 | 1.3 | 1.6 | 3.7 |
| Nontraffic | **.2** | .8 | .2 | .2 | .1 | .1 | .1 | .1 | .1 | .1 | .3 |
| Falls | **4.4** | .4 | ‡ | .2 | .3 | .4 | .3 | .6 | 1.0 | 2.4 | 27.4 |
| Fires and flames | **1.5** | 3.9 | 1.0 | .6 | .7 | .7 | .8 | .7 | .9 | 1.4 | 3.8 |
| Inhalation and ingestion of food or other object | **1.4** | .7 | .1 | .1 | .2 | .2 | .2 | .3 | .6 | 1.2 | 7.0 |
| Poisoning by solids and liquids | **1.1** | .2 | ‡ | .4 | .9 | 1.4 | 1.8 | 1.5 | 1.1 | 1.2 | 1.8 |
| Drowning† | **.7** | 3.0 | .8 | .5 | .5 | .5 | .4 | .4 | .3 | .5 | .8 |
| Accidental deaths as a percentage of all deaths | **3** | **36** | **40** | **52** | **39** | **27** | **18** | **10** | **4** | **2** | **2** |
| Motor vehicle accident deaths as a percentage of all accidental deaths | **47** | **37** | **63** | **87** | **81** | **73** | **66** | **63** | **58** | **49** | **23** |

* Includes ages under 1.

† Exclusive of deaths in water transportation.

‡ Less than 0.05.

Source: Computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on data from the Division of Vital Statistics, National Center for Health Statistics and the Bureau of the Census.

## Motor Vehicle

Motor vehicle accidents accounted for more fatalities than any other type of accident for both sexes in every age group between 1 and 64; only at ages 65 and over was the motor vehicle mortality surpassed by that from falls. Motor vehicle deaths peaked for men in the 20-24 age group, producing a rate of 61.5 per 100,000. This high was followed by the rate of 51.9 among the 15-19-year-olds. In these two age groups alone, such accidents were responsible for close to three-fourths of the total accident mortality.

Among women, the highest motor vehicle mortality rates were in the same two age groups but in reverse order than that for men. That is, the mortality rate peaked among 15-19-year-old women (22.0 per 100,000) followed by the rate of 17.4 among 20-24 year olds and 16.2 for ages 65 and over. As with total accidents, the largest proportionate difference in these rates was among women in their 20s where their rates were more than three and one-half times lower than their male counterparts. While motor vehicle accident death rates are consistently lower among women than men, they account for higher proportions of the female total accident fatalities in every age group between 1 and 64.

Traffic accident deaths among pedestrians were particularly high among persons 65 years old or older

Death rates from traffic accidents among pedestrians were particularly high among men and women 65 years old or older. It is important to note, however, that at the other end of the age range, almost half of all boys aged 1-4 who were killed in traffic accidents were pedestrians.

## Falls

Falls were the second leading cause of fatal accidents among both men and women at all ages combined. The relative difference between the sexes in these rates is the least pronounced of the six accidental death categories at ages 65 and over. The rates varied extensively by age. The rates were only slightly lower than motor vehicle deaths among men aged 65 and over, 30.6 versus 31.4 per 100,000, respectively. Deaths from falls were ranked No. 1 among women at these older ages; the rate was 69 percent higher than that from motor vehicles. Among men, 60 percent of all deaths from accidental falls occurred at ages 65 and over where the mortality rate was 30.6 per 100,000. Among women, 88 percent of all fatal accidental falls occurred at these ages producing a death rate of 27.4 per 100,000.

## Drowning

Drowning deaths (excluding those associated with boating accidents) were the third leading cause of accidental deaths among men of all ages, combined, but sixth among women. The male mortality rate from drownings was four and one-half times that among females, all ages combined, and remained substantially higher across all age groups. Accidental drownings among preschool-age boys, 1-4 years old, were the highest followed closely by 15-19-year-old males. These rates were followed by those among 20-24-year-olds. The highest drowning death rate for females was also among preschoolers with a rate of 3.0 per 100,000. The second highest drowning rate among females was experienced by 5-14-year-olds and also those 65 and over.

## Poisoning

Poisoning by solids and liquids (including drugs and medicaments) was the fourth and fifth leading cause of accidental death

## Table 3—Percent Change in Mortality From Leading Types of Accidents United States, 1976-77 to 1986-87

| | | | | | | Percent Change 1976-77 to 1986-87 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type of Accidents | All Ages* | 1-4 | 5-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-44 | 45-54 | 55-64 | 65+ |
| **MALE** | Accidents—All Types | **−17.2** | −25.0 | −26.4 | −21.4 | −17.5 | −12.6 | −8.7 | −16.2 | −24.1 | −26.2 | −17.0 |
| | Motor vehicle | **−12.2** | −31.9 | −14.3 | −13.9 | −8.3 | −3.9 | −5.6 | −10.6 | −16.7 | −19.9 | −14.2 |
| | Traffic | **−12.1** | −33.3 | −15.8 | −13.8 | −8.6 | −4.1 | −5.7 | −10.8 | −17.1 | −19.6 | −14.0 |
| | Pedestrian | **−14.3** | −42.0 | −27.5 | −19.0 | 11.4 | 13.2 | 5.7 | ‡ | −10.4 | −23.7 | −33.0 |
| | Nontraffic | **−14.3** | −29.4 | 25.0 | −20.0 | ‡ | 16.7 | ‡ | −16.7 | −16.7 | −28.6 | −22.2 |
| | Falls | **−23.5** | −50.0 | −40.0 | −35.3 | −20.0 | −9.1 | −4.2 | −27.0 | −35.6 | −32.0 | −30.6 |
| | Drowning† | **−31.1** | −14.5 | −39.5 | −40.9 | −30.9 | −24.5 | −23.7 | −26.7 | −26.9 | −32.0 | −18.5 |
| | Poisoning by solids and liquids | **22.7** | −57.1 | ‡ | −46.7 | −52.9 | −5.4 | 94.3 | 92.6 | 15.0 | ‡ | 22.2 |
| | Fires and flames | **−30.6** | −6.9 | −12.5 | −35.7 | −30.4 | −29.2 | −32.0 | −35.7 | −41.0 | −47.4 | −40.0 |
| | Inhalation and ingestion of food or other object | **‡** | −33.3 | −50.0 | −66.7 | −57.1 | −50.0 | −55.6 | −36.4 | ‡ | −17.9 | 61.7 |
| **FEMALE** | Accidents—All Types | **−12.4** | −26.1 | −27.8 | −9.0 | −9.3 | −.6 | −2.6 | −16.9 | −26.0 | −22.6 | −13.2 |
| | Motor vehicle | **−5.0** | −31.5 | −22.2 | −.5 | .6 | 9.6 | 3.2 | −4.3 | −6.3 | −7.4 | .6 |
| | Traffic | **−4.3** | −28.4 | −23.0 | −.5 | .6 | 9.7 | 3.2 | −4.3 | −5.4 | −6.6 | 1.3 |
| | Pedestrian | **−19.0** | −46.9 | −30.4 | −25.0 | −7.7 | 30.0 | ‡ | −8.3 | −23.5 | −15.8 | −22.9 |
| | Nontraffic | **‡** | −46.7 | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | ‡ | −50.0 | −25.0 |
| | Falls | **−25.4** | −55.6 | ‡ | −33.3 | ‡ | 33.3 | −25.0 | −25.0 | −50.0 | −35.1 | −32.8 |
| | Fires and flames | **−31.8** | −15.2 | −28.6 | −33.3 | −36.4 | −22.2 | −11.1 | −41.7 | −52.6 | −46.2 | −37.7 |
| | Inhalation and ingestion of food or other object | **27.3** | −36.4 | −50.0 | −66.7 | −33.3 | −33.3 | −33.3 | −57.1 | −40.0 | −33.3 | 75.0 |
| | Poisoning by solids and liquids | **−8.3** | −66.7 | ‡ | −42.9 | −43.8 | −6.7 | 28.6 | −11.8 | −45.0 | −33.3 | 28.6 |
| | Drowning† | **−22.2** | −9.1 | −27.3 | −44.4 | −28.6 | −16.7 | −20.0 | ‡ | −50.0 | −16.7 | −11.1 |

* Includes ages under 1.

† Exclusive of deaths in water transportation.

‡ Less than 0.05.

Source: Computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on data from the Division of Vital Statistics, National Center for Health Statistics and the Bureau of the Census.

among men and women, respectively, all ages combined. These fatalities were ranked No 2, however, among women in the age groups between 20 and 54. Such was the case for men only between the ages of 25 and 44. The heaviest mortality from this cause of death occurred among men in their early 30s– 6.8 per 100,000 among 30-34 year olds, followed by rates of 5.3 and 5.2 among men aged 25-29 and 30-34, respectively. For women, the highest accidental poisoning rates were among 30-34-year-olds and 65 and over, but these rates were less than 2 per 100,000.

### Fires and Flames

The heaviest death toll from fires and flames was reported among the very young and the aged of both sexes– those least likely to be able to save themselves in the case of fire. At ages 65 and over, the mortality rate from such accidents was 6.3 per 100,000 for men and 3.8 among women. At ages 1 to 4, the death rate was 5.4 for boys and 3.9 for girls. For all ages, combined, fires and flames ranked third as a cause of accidental death among women and fifth among men.

## Inhalation and Ingestion

Deaths from the accidental ingestion or inhalation of objects or food resulting in the obstruction of respiratory passages was the sixth leading cause of accidental deaths among men, all ages combined, and the fourth among women. The overwhelming majority of these accidents occurred among men and women 65 years old or older, 58 and 72 percent, respectively, of the total deaths from inhalation or ingestion. When the number of such accidental deaths among 55-64-year-olds is added, the proportion increases to 70 percent among men and 81 percent among women.

## Percent Change 1976-77 and 1986-87

As shown in Table 3, total accidental death rates have substantially decreased over the last 10 years for both sexes, in all age groups and for most causes. The largest decrease among men was evidenced for drowning deaths, all ages combined, where the rate dropped 31 percent from the 1976-77 rate. Total deaths for all men from fires and flames also decreased by more than 30 percent. A comparable decrease (32 percent) was reported for women, all ages combined, for deaths from fires and flames, followed by a 25 percent drop in accidental deaths from falls.

Poisoning by solids and liquids was the only category for which an increase in mortality was experienced for men, all ages combined; no such increase was evident among women. The 23 percent increase was due primarily to the greater than 90 percent increases in poisoning deaths among men in their 30s and early 40s. Among women, accidental poisoning rates decreased more than 8 percent between 1976-77 and 1986-87. The total decrease obtained despite a 29 percent *increase* in such deaths among women aged 30-34 and 65 and over.

Motor vehicle accidental mortality decreased the least of the six causes for both sexes. Among women these deaths decreased only 5 percent because the sizable decreases among the youngest age group were offset by a 10 percent *increase* among women aged 25-29. For both sexes in this age group, it is estimated that more than two-thirds of traffic fatalities are alcohol related.[4] The total male rate dropped 12 percent with the smallest decrease seen for men between the ages of 25 and 34.

## Prevention

Reporting fatalities from specific types of accidents by age and sex is helpful in identifying and defining high-risk groups and high-risk behaviors. Safety education and injury prevention programs designed especially for these groups can be effective in reducing the number of serious injuries and premature deaths from accidents. The increasing use of safety belts, the changes in minimum drinking age laws and the continuing decreases in the proportion of fatal motor vehicle accidents related to alcohol are encouraging and have contributed to the overall decrease in motor vehicle fatalities over the years.[4] It is hoped these decreases will continue despite the fact that at the end of 1987, speed limits had been increased in 38 states.[1] While it is clear that it is not possible to prevent all accidental deaths, the preventive potential of such deaths is enormous and deserves our increased attention and continued monitoring. □

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## References

[1] National Safety Council. *Accident Facts 1989*. Chicago, Ill.: National Safety Council, 1989.

[2] Baker, S.P., O'Neill, B., Karpf, R.S. *The Injury Fact Book*. Lexington, Mass.: Lexington Books, 1984.

[3] National Center for Health Statistics, unpublished data, 1989.

[4] National Center for Statistics and Analysis. *1988 Traffic Fatality Facts*. Washington, D.C.: U.S. Dept. of Transportation. National Highway Traffic Safety Administration, 1989.

# Trends in Medical Care Costs: A Look at the 1990s

As we begin the 1990s, there is little question that the debate over the policy direction of health care in the U.S. has intensified. While the quality and accessibility of care are major issues, monetary concerns have come to dominate the discussion. The purchasers of health care– employers, government, and individuals– are all experiencing the burden of rising expenditures for medical care. Insurance companies have found it necessary to increase premiums significantly. Continued spiraling costs already have led to significant changes in the delivery and payment of medical care. Those still searching for a quick-fix solution are likely to continue to be disappointed, but unless some headway becomes apparent, political attempts at quick-fixes will become more likely. In any event, it seems apparent that the evolution of the health care system in both makeup and as a public policy issue in the U.S. will continue and probably accelerate during the final decade of this century.

The evolution of health care as a public policy issue in the U.S. will continue and probably accelerate during the final decade of this century.

## Relative Size of Health Care Sector

Before examining the different scenarios that may unfold over the next 10 years, we need to review the health care cost situation and how we got here. The nation's health care bill for 1990 is projected at about $660 billion, representing an annual increase of almost 10 percent over the previous year. Figure A shows national health expenditures for the U.S. for the beginning of each decade since 1940.

The nation's health care bill for 1990 is projected at about $660 billion, representing an annual increase of almost 10 percent over the previous year.

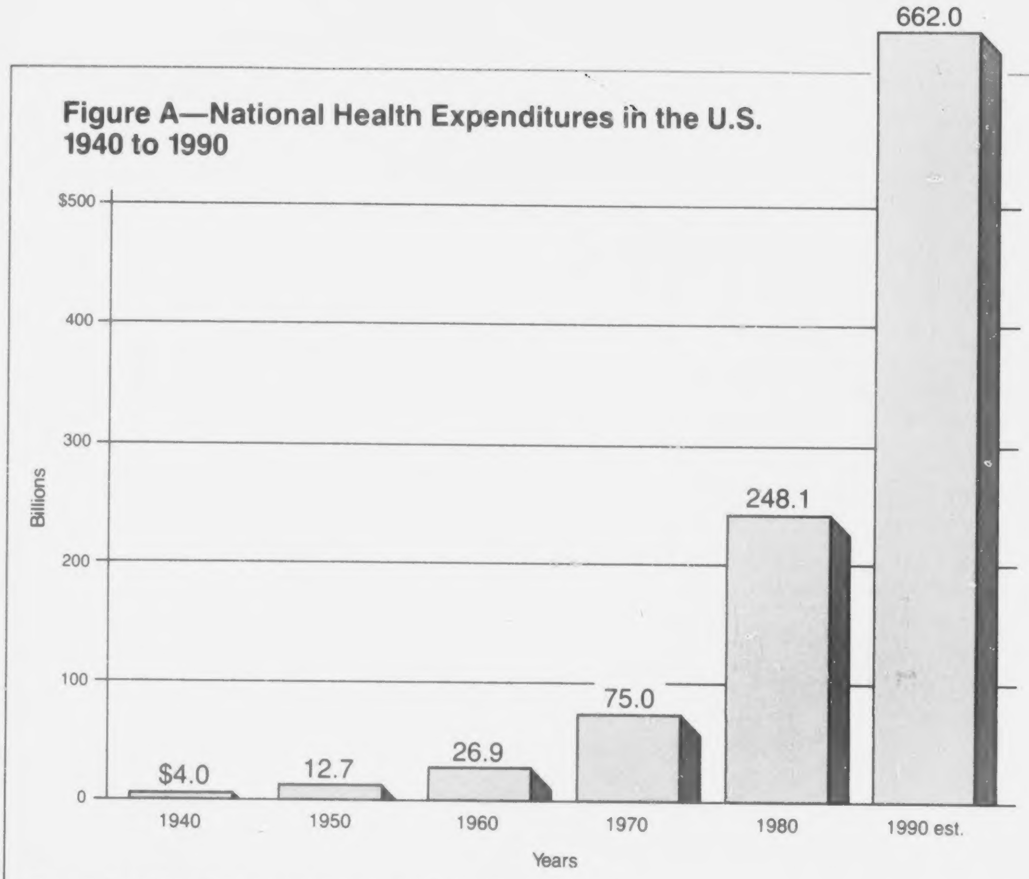
Probably the most widely quoted statistic on medical care costs is the relation to GNP.

Probably the most widely quoted statistic on medical care costs is the relation to gross national product. This rather simple concept gives a very graphic depiction of the relative increase in resources devoted to this sector. As shown in Figure B, health expenditures as a percent of GNP is estimated to reach almost 12 percent in 1990. This compares with 9.1 percent in 1980 and under 6 percent prior to the introduction of Medicare and Medicaid in the mid-1960s. The increase in spending on health care relative to the overall economy during this period reflects several factors:

- Above-average price gains for medical care goods and services.
- Advances in medical technology.
- Rising utilization.
- An aging population.

Discussions increasingly make unfavorable international comparisons of U.S. health care spending. Health care

**Figure A—National Health Expenditures in the U.S. 1940 to 1990**

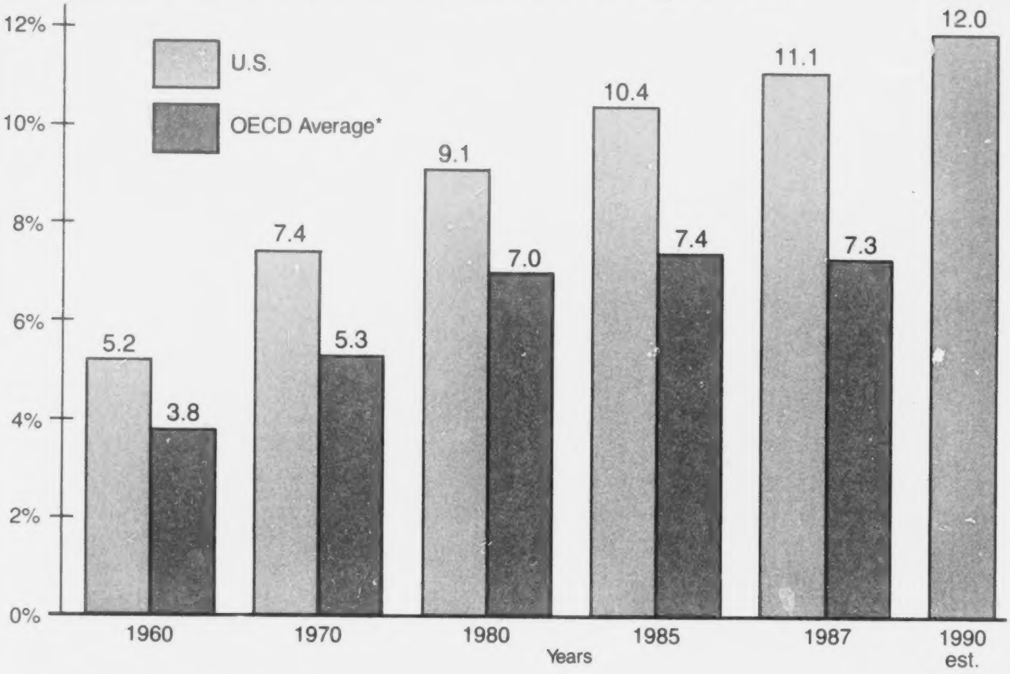


Sources: Health Care Financing Administration, Division of National Cost Estimates; and Metropolitan Life Insurance Company, Business Economics Department.

Health care spending in the U.S. continues to outpace that in other major industrial countries.

spending in the U.S., for instance, continues to outpace that in other major industrial countries. In 1987, per capita health care expenditures in the U.S. at over $2,050 were double the average for the next six largest industrial countries (Canada, France, Germany, Italy, Japan and the United Kingdom). Available data on health expenditures as a percent of Gross Domestic Product for the average of Organization for Economic Cooperation and Development (OECD) nations also are shown in Figure B. If one were to exclude the U.S. from the average, the levels would be even lower.

**Figure B—Health Expenditures as a Percentage of GNP**



*Based on Gross Domestic Product (GDP).

Sources: U.S. Data — Health Care Financing Administration, Division of National Cost Estimates; U.S. Department of Commerce; and Metropolitan Life Insurance Company, Business Economics Department.
OECD Data — "International Health Care Expenditure Trends: 1987." Health Affairs, p. 169, Fall 1989.

Furthermore, for all of the OECD nations, the U.S. is the only nation where this relationship is in double digits. At 9 percent, Sweden has the next highest level. While one must use caution in comparing international data, it would appear that the U.S. health care system, for whatever reasons, is relatively expensive.

> Available data point to a double-digit increase in 1989 for personal health expenditures, placing them at about $536 billion.

## Developments in Costs

Available data point to a double-digit increase in 1989 for personal health expenditures, placing them at about $536 billion. It is estimated that these expenditures amounted to roughly $486 billion in 1988– an increase of 9.7 percent over the prior year. Table 1 shows these expenditures for the 1979-1989 period.

As can be seen from the table, a deceleration in the growth of this spending coincided with the introduction in 1983 of Medicare's prospective payment system (PPS) for hospital care, which was based on diagnostic related groups (DRGs). However, a reacceleration has become quite apparent. As the table indicates, the patterns among the different categories are quite varied. While the shares of the total bill represented by hospital care and drugs have declined, those for physicians and other professional services have risen. Thus, a breakdown of these expenditures by category can give some valuable insight on recent developments and as to where costs may be headed.

It is estimated that the growth in hospital costs accelerated in 1989, recording an increase of over 9.5 percent.

## Hospital Care

As the largest expenditure category, particularly if the focus is on health insurance plans, hospital care has drawn much of the attention over skyrocketing costs. It is estimated that the growth in hospital costs accelerated in 1989, recording an increase of over 9.5 percent. This compares to an estimated 9.4 percent rise in 1988 and continues the upward pattern that has occurred since 1985. Although headway has been achieved in shortening and reducing inpatient hospital stays, to some extent this has been offset by growth in the volume and costs of outpatient services.

A form of PPS system for physician fees has been under study and soon is to be phased in for Medicare purposes.

## Other Expenditures

Although increasing at slightly lower rates than in recent years, expenditures for physicians' services continue to show double-digit jumps of close to 12 percent. Efforts to hold back these costs will probably be the next major battleground in the war against skyrocketing expenditures. A form of PPS system for physician fees has been under study and soon is to be phased in for Medicare purposes. Among the remaining categories, "other professional services" continues to surge, with its share showing the largest relative increase during the 1980s. In large part, this reflects the increased use of home care.

## Medical Care Inflation

Previous studies have shown that price increases account for about two-thirds of the increase in health expenditures. Medical care prices have traditionally increased at a faster pace than the general inflation

Medical care prices have traditionally increased at a faster pace than the general inflation rate.

## Table 1—Total Expenditures on Personal Health Care* United States, 1979 to 1989

($ Billion)

| Year | Total Personal Health Care | Hospital Care | Physicians' Services | Dentists' Services | Other Prof'l. Services | Drugs & Medical Sundries | Eyeglasses and Appliances | Nursing Home Care | Other Health Services |
|---|---|---|---|---|---|---|---|---|---|
| 1989 est. | $535.5 | $233.5 | $128.0 | $39.8 | $22.0 | $38.0 | $10.7 | $48.5 | $15.0 |
| 1988 est. | 485.5 | 213.0 | 114.5 | 36.0 | 18.4 | 35.5 | 10.0 | 44.5 | 13.6 |
| 1987 | 442.6 | 194.7 | 102.7 | 32.8 | 16.2 | 34.0 | 9.5 | 40.6 | 12.0 |
| 1986 | 401.6 | 178.4 | 91.6 | 29.6 | 14.1 | 31.3 | 8.7 | 37.4 | 10.7 |
| 1985 | 368.3 | 166.7 | 81.4 | 27.1 | 12.4 | 28.5 | 7.8 | 34.7 | 9.8 |
| 1984 | 340.1 | 156.1 | 74.4 | 24.6 | 10.8 | 26.5 | 7.0 | 31.6 | 9.0 |
| 1983 | 314.7 | 146.8 | 68.4 | 21.7 | 9.3 | 24.5 | 6.2 | 29.4 | 8.3 |
| 1982 | 286.5 | 135.2 | 61.8 | 19.5 | 8.0 | 22.1 | 5.8 | 26.7 | 7.4 |
| 1981 | 254.7 | 119.1 | 54.8 | 17.3 | 6.8 | 20.7 | 5.3 | 23.9 | 6.8 |
| 1980 | 219.7 | 101.6 | 46.8 | 15.4 | 5.7 | 18.8 | 5.1 | 20.4 |  |
| 1979 | 189.7 | 87.0 | 40.2 | 13.3 | 4.7 | 17.1 | 4.7 | 17.4 | 5.1 |
| **Percent Change From Previous Year** |  |  |  |  |  |  |  |  |  |
| 1989 est. | 10.3 | 9.6 | 11.8 | 10.6 | 19.6 | 7.0 | 7.0 | 9.0 | 10.3 |
| 1988 est. | 9.7 | 9.4 | 11.5 | 9.8 | 13.6 | 4.4 | 5.3 | 9.6 | 13.3 |
| 1987 | 10.2 | 9.1 | 12.1 | 10.8 | 14.9 | 8.6 | 9.2 | 8.6 | 12.1 |
| 1986 | 9.0 | 7.0 | 12.5 | 9.2 | 13.7 | 9.8 | 11.5 | 7.8 | 9.2 |
| 1985 | 8.3 | 6.8 | 9.4 | 9.9 | 14.8 | 7.5 | 11.4 | 9.8 | 8.9 |
| 1984 | 8.1 | 6.3 | 8.8 | 13.3 | 16.1 | 8.4 | 12.0 | 7.5 | 8.4 |
| 1983 | 9.8 | 8.6 | 10.7 | 11.6 | 17.0 | 10.6 | 6.4 | 9.9 | 13.0 |
| 1982 | 12.5 | 13.5 | 12.8 | 12.5 | 16.9 | 6.9 | 9.4 | 12.0 | 9.2 |
| 1981 | 15.9 | 17.2 | 16.9 | 12.3 | 19.8 | 10.4 | 5.6 | 17.1 | 14.2 |
| 1980 | 15.8 | 16.8 | 16.4 | 15.7 | 19.9 | 9.5 | 7.8 | 17.1 | 15.4 |
| 1979 | 13.3 | 14.1 | 12.4 | 13.1 | 15.3 | 11.1 | 13.0 | 15.3 | 8.1 |
| **Percent Distribution** |  |  |  |  |  |  |  |  |  |
| 1989 est. | 100.0 | 43.6 | 23.9 | 7.4 | 4.1 | 7.1 | 2.0 | 9.1 | 2.8 |
| 1988 est. | 100.0 | 43.9 | 23.6 | 7.4 | 3.8 | 7.3 | 2.1 | 9.2 | 2.8 |
| 1987 | 100.0 | 44.0 | 23.2 | 7.4 | 3.7 | 7.7 | 2.1 | 9.2 | 2.7 |
| 1986 | 100.0 | 44.4 | 22.8 | 7.3 | 3.5 | 7.8 | 2.2 | 9.3 | 2.7 |
| 1985 | 100.0 | 45.3 | 22.1 | 7.4 | 3.4 | 7.7 | 2.1 | 9.4 | 2.7 |
| 1984 | 100.0 | 45.9 | 21.9 | 7.2 | 3.2 | 7.8 | 2.1 | 9.3 | 2.6 |
| 1983 | 100.0 | 46.6 | 21.7 | 6.9 | 3.0 | 7.8 | 2.0 | 9.3 | 2.6 |
| 1982 | 100.0 | 47.2 | 21.6 | 6.8 | 2.8 | 7.3 | 2.0 | 9.3 | 2.6 |
| 1981 | 100.0 | 46.8 | 21.5 | 6.8 | 2.7 | 8.1 | 2.1 | 9.4 | 2.7 |
| 1980 | 100.0 | 46.2 | 21.3 | 7.0 | 2.6 | 8.6 | 2.3 | 9.3 | 2.7 |
| 1979 | 100.0 | 45.9 | 21.2 | 7.0 | 2.5 | 9.0 | 2.5 | 9.2 | 2.7 |

*Does not include outlays for research and construction, expenses for prepayment and administration, and government public health activities.
Note: Due to rounding, components may not add exactly to totals. Percent change for 1983 and prior years based on unrounded numbers.
Sources: Various reports of the U.S. Health Care Financing Administration, Division of National Cost Estimates.
Estimates by Metropolitan Life Insurance Company, Business Economics Department.

rate. As shown in Table 2, the gap between the rise in the medical care CPI and the total CPI increased during the 1980s–averaging about 2.5 percent for the period compared to a 0.7 percentage point difference during the 1970s. The differential is expected to widen further in 1990. Of note among recent price developments was the pickup in hospital room charges, with the first double-digit increase since 1983. Furthermore, in 1989 other inpatient services and outpatient hospital services recorded gains of 13.2 percent and 10.8 percent, respectively. These increases are of particular concern for health insurance purposes since hospital care accounts for a major portion of benefit payments. The difference in component weights for hospital care between the medical care CPI and health insurance plans explains, in large part, why cost experiences have shown gains substantially greater than the medical care CPI. Other factors include: increased utilization, advances in technology, catastrophic cases, and cost shifting. Prescription drugs showed a larger-than-expected price increase and the price rise for physicians' services continued at over 7 percent; however, there is some good news in that charges for dental services have decelerated.

## Health Care and Economics

Traditionally, health care has been looked upon somewhat differently than other goods and services. Progress has been encouraged without consideration to cost. It is becoming doubtful whether this approach can continue without some modifications. Elementary economic theory teaches that for any given time a nation's resources can be considered as finite. In some way, decisions must be made to determine "what, when, how, and for whom" goods and services are produced. Although health care can be viewed from slightly different angles than other goods and services, it cannot be totally divorced from fundamental economic principles. The relative increase of health care costs implies that other sectors must grow more slowly. Furthermore, in a market economy, the price mechanism plays a crucial role in the allocation process.

> For much of the 1980s, the pro-competition concept was put forth as a possible solution to the health cost problem.

For much of the 1980s, the pro-competition concept was put forth as a possible solution to the health cost problem. This was based on the belief that much of the problem reflected the sector's immunity to market forces. The introduction of competitive market forces among health care providers was intended to restrain price increases. While there is evidence that to a certain degree the position was correct, because of the nature of the health care sector there were probably predetermined limits to its success. To a large extent, demand for health care is influenced by a key supplier–the physician. Furthermore, consumers still are isolated from a large portion of the total costs.

> Cost-containment was based on the belief that if consumers were given incentives, namely monetary, they could be directed to make cost-saving decisions.

## Table 2—Percent Change From Previous Year in Selected Items of Medical Care Consumer Price Index (CPI) United States, 1970 to 1990

(Annual Averages)

| Item | 1970 to 1979 | 1980 to 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | Estimate 1989 | Forecast 1990 |
|---|---|---|---|---|---|---|---|---|---|
| Prescription Drugs | 3.7 | 10.8 | 9.6 | 9.5 | 8.6 | 8.0 | 8.0 | 8.6 | 8.3 |
| Physicians' Services | 8.0 | 9.7 | 6.9 | 5.9 | 7.2 | 7.3 | 7.3 | 7.4 | 7.2 |
| Hospital Rooms | 11.2 | 11.8 | 8.3 | 5.9 | 6.0 | 7.2 | 9.3 | 10.4 | 10.4 |
| Dental Services | 6.7 | 9.0 | 8.1 | 6.2 | 5.6 | 6.8 | 6.8 | 6.2 | 6.1 |
| Medical Care: All Items | 7.8 | 10.5 | 6.2 | 6.3 | 7.5 | 6.6 | 6.5 | 7.7 | 8.1 |
| **TOTAL CPI** | **7.1** | **8.3** | **4.3** | **3.6** | **1.9** | **3.6** | **4.1** | **4.8** | **4.2** |

Sources: U.S. Bureau of Labor Statistics and Metropolitan Life Insurance Company, Business Economics Department.

Because of the above factors, another concept that gained acceptance during the 1980s was that of cost-containment. It was based on the belief that if consumers were given incentives, namely monetary, they could be directed to make cost-saving decisions. Thus, deductibles were raised, and coinsurance and mandatory second opinions included in health insurance plans. With hospital costs representing the largest share of the increase, significant efforts were directed at reducing inpatient hospital charges. The government introduced its PPS for Medicare, and private insurers gave incentives for ambulatory treatment. If one expected these measures along with increased competition to halt the spiral of medical care costs, then one might conclude that they failed. However, a different conclusion may be arrived at if the results are judged from the standpoint of "where would costs be if these measures were not taken."

As we enter a new decade, the concept that has come to the forefront is that of managed care.

## Prospects for the 1990s

As we enter a new decade, the concept that has come to the forefront is that of managed care. Although far from new in its elementary form, this concept now recognizes some of the limitations of previous measures and attempts to mold together some of the strong points of each. Certain conditions for the progress of managed care should improve over the next several years. As ties to the traditional family doctor become weaker, it is expected that people will be more inclined to join health maintenance organizations (HMO) and make use of preferred provider organizations (PPO). The concept already is being spread to the senior citizen segment by encouraging them to join HMOs under Medicare.

As ties to the traditional family doctor become weaker, it is expected that people will be more inclined to join health maintenance organizations and make use of preferred provider organizations.

The seemingly endless spiral in health care costs, however, has given rise to new and stronger calls for some form of national program. What makes current conditions different than previous debates for national health insurance is that several corporations have added their voices to such pronouncements.

Based on alternative projections, by the year 2000 health expenditures in the U.S. will have reached between 13 percent and 17 percent of GNP. While the figure is likely to come somewhere in between this range – estimates by the Health Care Financing Administration put it at 15%– how close it is to either side will depend on several critical choices that will have to be made during the 1990s.

The 1980s have witnessed annual increases averaging slightly over 10 percent for health care expenditures, resulting in these costs approaching 12 percent of GNP. Despite extensive efforts to restrain costs, employers have seen their bill for employee health care jump to over $150 billion. The impact from retiree health benefits is mounting. As we enter the 1990s, government continues its attempt to restrain health care spending, which in turn results in a certain amount of cost shifting. Individuals are being asked to pay a larger portion, and this is already meeting resistance among unionized employees. The 1990s will see continued strong efforts to restrain costs. Greater use of ambulatory and home care, further growth of HMOs and managed care, and additional use of the DRG concept are likely. Nevertheless, medical care prices will probably continue to outpace the general inflation rate. Congress will remain hesitant to adopt any sweeping health legislation, particularly in the near term, because of current problems in catastrophic insurance coverage. However, some changes in the national framework concerning health care are likely. □

***Joseph V. Vincenzino***
*Senior Economist, Business Economics*
*Metropolitan Life Insurance Company*

# STATISTICAL INFORMATION, PLEASE

**Q** ***How has the number of babies delivered by midwives changed over the years?***

**A** The number of babies delivered by midwives both in and out of hospitals has increased considerably over the years. These in-hospital deliveries almost quintupled between 1975 and 1987, increasing to 98,425 from 19,686 in 1975. Notwithstanding, these deliveries by midwives were a small proportion of all births–just 2.6 percent.

Out-of-hospital deliveries by midwives increased by 63 percent during this period, and in 1987 represented over two-fifths of the total out-of-hospital births. Physicians and other attendants were responsible for the remaining out-of-hospital deliveries.

The South leads with the largest proportion of out-of-hospital deliveries by midwives (45.3 percent). For such in-hospital births, the South and West are virtually tied with 34.1 percent and 35.3 percent, respectively.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

**Q** ***How many stepchildren under age 18 in the United States are in married-couple families and with whom do they live?***

**A** In 1985 there were 6.8 million stepchildren under age 18 living in married-couple families, 15 percent more than in 1980, according to estimates from the U.S. Bureau of the Census.

Nine-tenths of these children–over 6 million–live with their biological mothers and stepfathers, while only 740,000 live with their biological fathers and stepmothers.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

**Q** ***Since the last census, how does the growth in number of households compare with that for the total population?***

**A** The number of households in the United States has grown at a faster pace than the total population. Data released by the Bureau of the Census show that between 1980 and 1988, the number of households increased by 13.9 percent; the population grew by 8.5 percent. The West recorded the largest relative increase, the South was next, followed by the Northeast. The Midwest had the smallest increase.

The following table shows the resident population and number of households for 1980 and 1988 as well as the percent change over that period.

**U.S. Population and Number of Households, by Region, 1980 and 1988**

| | Resident Population (1,000s) | | | Number of Households (1,000s) | | |
|---|---|---|---|---|---|---|
| | 1980 (Census) | 1988 July 1 | Percent Change 1980-88 | 1980 (Census) | 1988 July | Percent Change 1980-88 |
| United States | 226,546 | 245,807 | 8.5 | 80,390 | 91,538 | 13.9 |
| Northeast | 49,135 | 50,595 | 3.0 | 17,471 | 19,016 | 8.8 |
| Midwest | 58,866 | 59,878 | 1.7 | 20,859 | 22,479 | 7.8 |
| South | 75,372 | 84,655 | 12.3 | 26,486 | 31,400 | 18.6 |
| West | 43,172 | 50,679 | 17.4 | 15,574 | 18,643 | 19.7 |

Source: U.S. Bureau of the Census, P-25, No. 1044

*Please send your questions to:*

Statistical Information Editor
Health and Safety Education Division, Dept. SB
Metropolitan Life Insurance Co.
One Madison Avenue
New York, N.Y. 10010-3690

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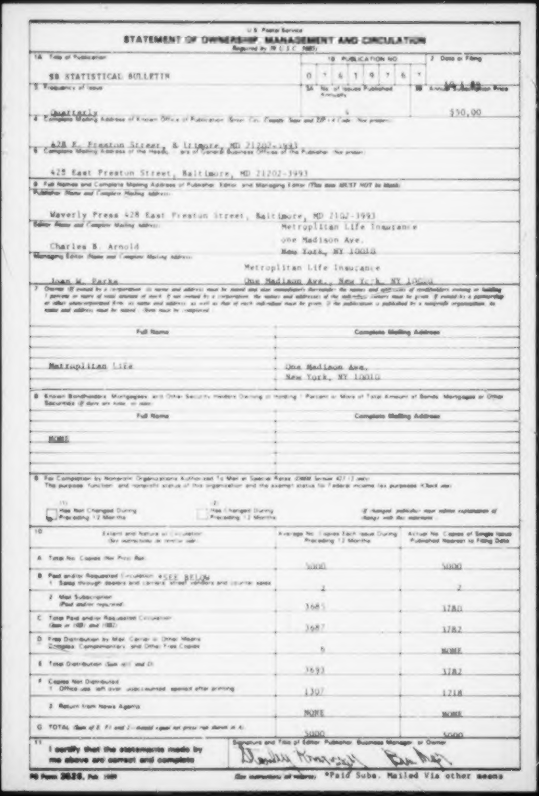
Suicide: International Mortality Differences

Reported Cases of Measles
United States, 1978 and 1988

Chronic Obstructive Pulmonary Disease:
Regional Variations

U.S. and Canadian Population
by State and Province: 1990



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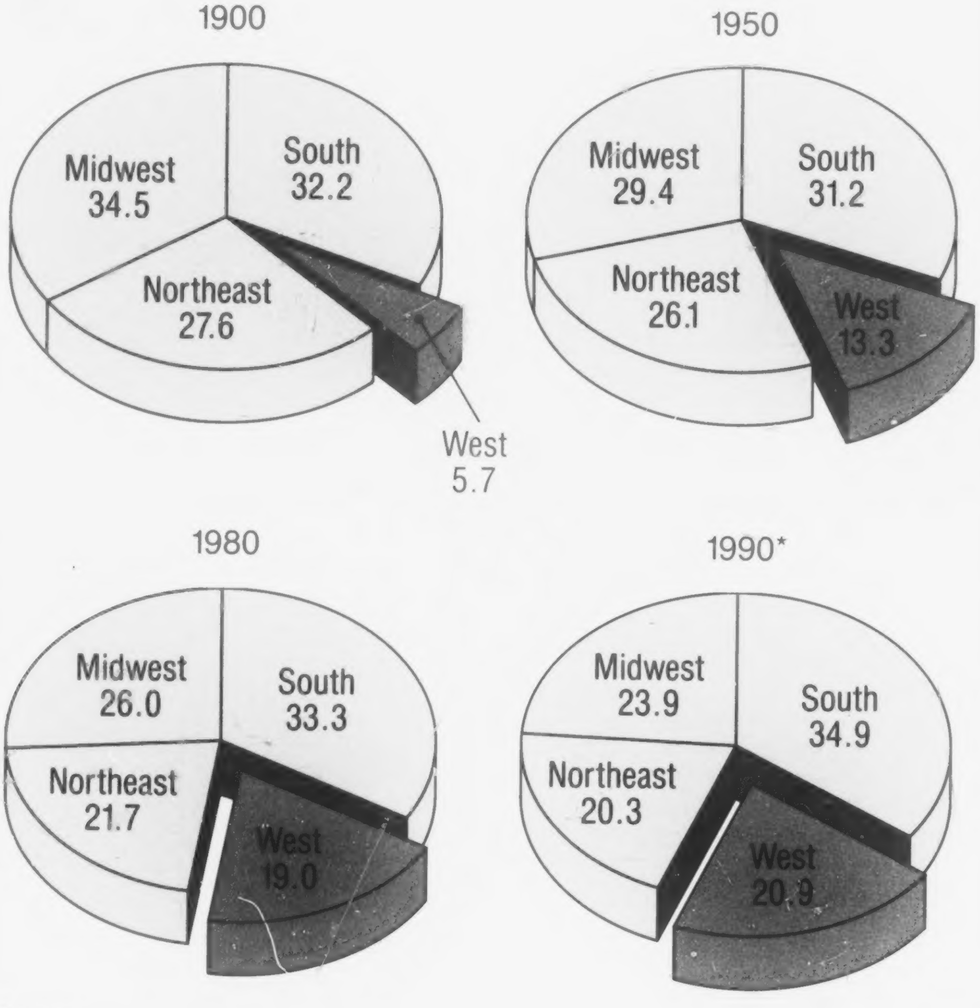
# Historical Perspectives

**U.S. Population by Region**
**April 1, 1900, 1950, 1980 and July 1, 1990**
**Percent Distribution**



* Projected
Source: U.S. Bureau of the Census

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AND AFFILIATED COMPANIES

# SB
## STATISTICAL BULLETIN

Vol 71 No 2 Apr–Jun 1990

2 **Social Climate in American Public Schools, 1989.** Selected data from MetLife's Louis Harris survey of American teachers that found several major barriers to learning. Martin C. Ushkow, M.D., Chair, Committee on School Health, American Academy of Pediatrics, provides an insightful commentary.

11 **Measles in the United States: The Epidemic of 1989.** Analysis of a serious public health threat. In the commentary, *SB*'s editor reviews some significant underlying facts and issues.

22 **International Comparison of Mortality From Suicide.** Data analyses reveal remarkable differences among the developed nations.

29 **United States, Canada: Population Changes.** A review of the decade's demographic growth and some decline by state and province.

# From the Editor's Desk

Much has been written about the performance gap in American education. In this issue, the lead article —"Social Climate in American Public Schools, 1989"— analyzes several socially uncomfortable attributes of students with implications for learning and personal achievement.

## Students' Problems: Teachers' Perceptions

These data were collected from a nationwide survey of public school teachers for MetLife by Louis Harris and Associates in 1985 and 1989. In every category we report— drinking, drug abuse, teen pregnancy, school dropouts, and teen suicide— teachers perceived the problems as worse in 1989 than four years earlier.

In a companion commentary, Dr. Martin Ushkow, Chair, Committee on School Health, American Academy of Pediatrics, asks whether the United States can develop a unity of purpose to improve the lives of our youth, thus making our nation's future brighter.

## Measles Epidemic

In the event you missed the recent news, measles has returned to this country with a vengeance. In 1989 the nation had nearly 17,000 new cases, mostly among preschoolers. *SB* analyzes this outbreak in the article, "Measles in the United States: The Epidemic of 1989." Our commentary reviews some policy dilemmas and the need for concerted action if 1990 is to be a better public health year. The Health Objectives for the Nation, 1990, had 500 as its national goal for total U.S. measles cases. By January 31, this year, that number was exceeded.

## Suicide Rates Compared

Suicide rates vary remarkably among developed nations. *SB* takes a closer look at international suicide statistics. Can you guess which countries have the highest and the lowest rates? The editors were surprised at the data when we first saw them. They raise new questions about this most puzzling cause of death. While *SB* does not have psychosocial interpretations of the data, we would welcome yours.

## Population Growth and Decline

In this census year, when population growth is much on everyone's mind, *SB* examines United States and Canadian populations. Interestingly, we found that in the past decade the U.S. and Canada each grew at the rate of 1.0 percent a year. That similarity notwithstanding, there were remarkable state and provincial growth differences. But not all areas grew larger in the 1980s. Do you know which four had population declines?

On that inquiring note, I wish you good reading. □

Charles B Arnold

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*The Statistical Bulletin will publish comment and criticism from readers about its contents. Alternate interpretations of data analyses or different points of view about subjects are particularly welcome. Use address at end of publisher's statement, opposite page.*

# Social Climate in American Public Schools, 1989

In 1984 Metropolitan Life Insurance Company asked Louis Harris and Associates, Inc., to survey American public school teachers about their concerns and aspirations as educators.[1] Since then, annual surveys have been completed, each addressing different aspects of the educational situation across the country.[2-6]

The following report presents selected data* from the sixth and latest of these surveys of the American teacher.[7] The 1989 survey was conducted between May and June 1989 and focused on teachers' opinions of educational changes during the decade, their classroom experiences and their plans and hopes for the future. The survey also examined societal problems faced by teachers in the classroom, plus their perceptions of trends in these behaviors. These student-related behaviors form the basis of this report.

The survey results are based on the responses of a nationally representative sample of 2,000 teachers of kindergarten through 12th grade. In all cases, interviews were conducted on the phone with actively employed public school teachers. The teachers surveyed were highly experienced professionals with a majority being white, women and/or teachers in elementary schools (Table 1). More than half of the teachers taught in small town or rural area schools, with 21 percent teaching in urban settings.

## Overall Evaluation

The survey results show continuing support for, and belief in, changes in the educational system, but increasing concern about the social problems reflected in students' behaviors. Among the positive findings is the fact that 8 out of 10 teachers expressed optimism about the future quality of the teaching in their schools. In addition, more than 40 percent were supportive of various school reforms during 1989; 44 percent felt that the quality of the education provided was excellent; 48 percent considered teaching quality "good," and 93 percent felt that their fellow teachers were dedicated to their work. While the vast majority (81 percent) indicated they "...love to teach," the survey revealed serious and apparently worsening problems confronting today's teachers.

## Problems Confronting Teachers

Not surprisingly, most issues were perceived as being more serious by teachers with all or many minority students, in inner-city schools or in schools judged to be of fair or poor quality. (Such schools comprised 24, 10 and 7 percent, respectively, of the sample.) Teachers in these three settings tended to consider the number of students left on their own after school, students' lack of basic skills, and absenteeism more negatively than the total group of teachers and/or various other categories of teachers.

> "Latchkey children" were considered a *very* serious problem by more than half of teachers in inner-city schools and in schools rated fair or poor quality.

While the majority of all the teachers considered "latch key" children a serious problem, more than half of the inner-city school teachers and those in schools of fair or poor quality said this was a *very* serious problem at their school (54 and 57 percent, respectively) (Table 2). These latter proportions are in contrast to an average of 33 percent for the total sample

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*The complete report is available upon request.

*David Johnson*

## Table 1—Demographic Characteristics of Surveyed Public School Teachers United States, 1989

| Characteristic | Number | Percent* |
|---|---|---|
| Sex | | |
| Male | 588 | 29 |
| Female | 1,412 | 71 |
| Experience in Teaching | | |
| Less than 5 years | 141 | 7 |
| 5-9 years | 298 | 15 |
| 10-19 years | 863 | 43 |
| 20 years or more | 696 | 35 |
| Type of School† | | |
| Elementary | 1,048 | 52 |
| Junior high/middle school | 430 | 22 |
| High school | 443 | 22 |
| Race | | |
| White | 1,779 | 89 |
| Black | 119 | 6 |
| Hispanic | 66 | 3 |
| Asian | 6 | ‡ |
| School Location | | |
| Inner city | 197 | 10 |
| Urban | 222 | 11 |
| Suburban | 439 | 22 |
| Small town | 627 | 32 |
| Rural | 512 | 26 |

* Based on 2,000 responses and weighted by Louis Harris and Associates, Inc. to the latest parameters for race and geographic region.
† Seventy-nine teachers taught in both junior high and high school.
‡ Less than 0.5 percent.
Source: *The Metropolitan Life Survey of The American Teacher, 1989.*

who responded this negatively. Only 24 percent of the teachers in small schools (fewer than 200 students) and/or in schools rated "excellent" considered this issue very serious in their respective schools.

Lack of basic skills continues to be regarded as a serious problem to the vast majority of teachers and the situation is getting worse. Almost three-quarters of the teachers considered this a serious problem in 1989, whereas two-thirds held this view one year earlier. Virtually all (96 percent) of the teachers in schools of fair or poor quality perceive the students' lack of basic skills as a serious issue. Large proportions of inner-city school teachers (88 percent) and those with many or all minority students (87 percent) share this concern. The report indicated that the lack of basic skills is somewhat less of a problem in elementary schools, presumably because teachers feel there is more time to correct deficiencies. Nonetheless, it is of serious concern to almost two-thirds of the elementary school teachers surveyed.

Students' lack of basic skills was considered a serious problem by 71 percent of teachers in 1989—up from 66 percent in.

Absenteeism was considered a serious problem by 53 percent of the public school teachers surveyed in 1989.

More than half (53 percent) of the public school teachers surveyed in 1989 considered absenteeism a serious problem. Less than half (47 percent) held this view in 1988, which represents an increase of 15 percent in just one year. Of note is that the proportion who rated this issue "very serious" almost doubled between 1988 and 1989, increasing from 11 to 19 percent. As could be expected, this issue is more of a problem in the higher grades than in elementary school (69 percent versus 38

## Table 2—Public School Teachers' Evaluations of the Seriousness of Student Problems, United States, 1989

| | Very Serious | Somewhat Serious | Not Very Serious | Not At All Serious |
|---|---|---|---|---|
| **Children Unattended After School:** | | Percent | | |
| All Teachers | 33 | 43 | 17 | 5 |
| Junior or Middle School | 37 | 45 | 11 | 4 |
| Inner-City School | 54 | 32 | 9 | 2 |
| All or Many Minority Students | 44 | 39 | 9 | 3 |
| School Rated Fair or Poor Quality | 57 | 26 | 11 | 4 |
| Less than 200 Students | 24 | 36 | 28 | 9 |
| **Lack of Basic Skills:** | | | | |
| All Teachers | 22 | 49 | 24 | 5 |
| Elementary | 18 | 46 | 29 | 7 |
| Grades 7-12 | 26 | 52 | 18 | 3 |
| Inner-City Schools | 43 | 45 | 10 | 2 |
| All or Many Minority Students | 38 | 49 | 11 | 1 |
| School Rated Fair or Poor Quality | 63 | 33 | 4 | – |
| **Absenteeism:** | | | | |
| All Teachers | 19 | 34 | 30 | 16 |
| Elementary | 9 | 29 | 37 | 24 |
| Grades 7-12 | 31 | 38 | 23 | 8 |
| Inner-City Schools | 37 | 36 | 20 | 7 |
| All or Many Minority Students | 29 | 37 | 24 | 10 |
| School Rated Fair or Poor Quality | 46 | 34 | 16 | 4 |

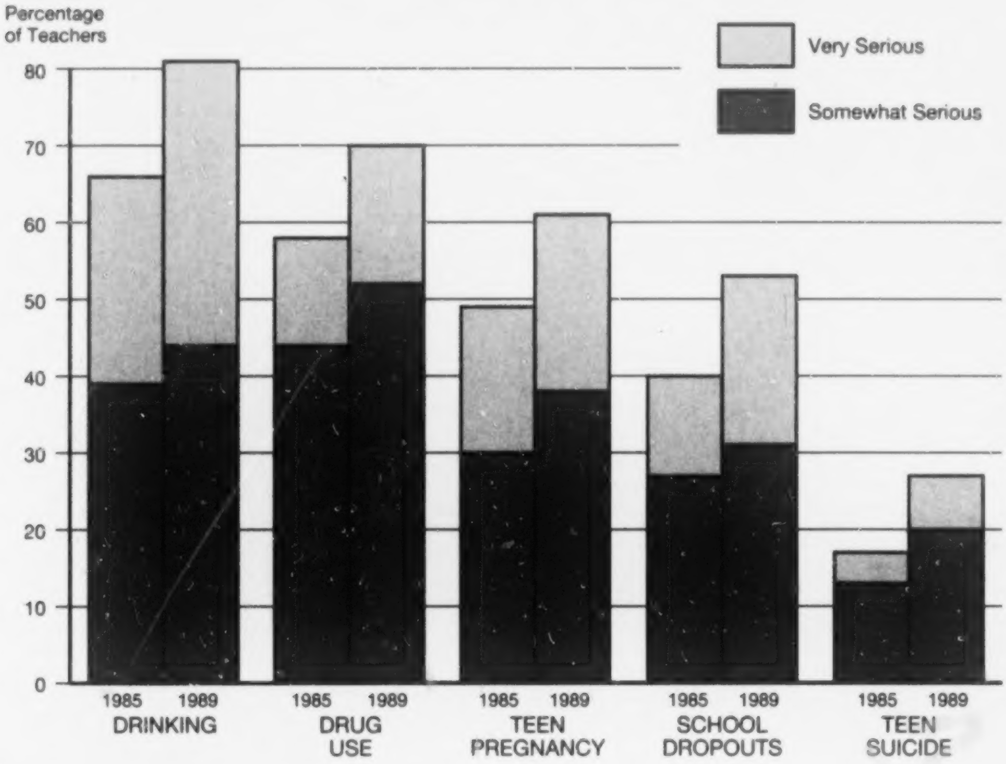
Source: *The Metropolitan Life Survey of The American Teacher, 1989.*

percent, respectively). This problem is the most pervasive in schools of fair or poor quality, where 8 out of 10 teachers rated it as "serious." This was followed by almost three-fourths of inner-city school teachers who voiced the same degree of concern.

## Trends

According to the teachers surveyed, the problems presented by students in grades 7 through 12 have become worse since the mid-1980s. Between 1985 and 1989, the sum of "very serious" and "somewhat serious" responses increased more than 20 percent for each behavior presented in Figure A. Even more disturbing, however, is that the proportions of teachers who considered the behaviors as "very serious" showed even larger relative increases—increases that ranged from 21 percent for teenage pregnancies to 75 percent for teen suicide.

**Figure A—Percentage of Teachers Reporting Serious* Student† Problems in Their Schools, United States, 1985 and 1989**



*Serious = sum of "very" serious and "somewhat" serious.
† Students in grades 7-12.
Source: *The Metropolitan Life Survey of the American Teacher, 1989.*

## Suicide

Teenage suicide was the only behavior presented in Figure A that was not considered a serious problem by one-half or more of the teachers surveyed in 1989. Nonetheless, it is considered a serious (somewhat serious and/or very serious) problem by more than one-fourth of all the teachers, up from 17 percent in 1985. This rise represents a proportionate increase of 59 percent over the 1985 total. Even more alarming, however, is the 75 percent relative increase between 1985 and 1989 in the proportion of teachers thinking teen suicide was a *very* serious problem in their schools. While inner-city school teachers considered this slightly less of a problem than other teachers, there was very little variation in the rating of this behavior by category of school. Teenage suicide appears to be a serious problem to almost 1 in 4 teachers in all kinds of schools across the country.

## School Dropouts

Dropouts were considered a serious problem by 53 percent of the teachers in 1989 in comparison to 40 percent of the teachers in 1985. This 33 percent relative increase was the second largest increase in severity rating of the behaviors surveyed.* Of particular note is the 69 percent increase in the proportion of teachers rating this a *very* serious problem in 1989 versus 1985. Dropouts were considered a more serious problem to teachers in schools of fair or poor quality (80 percent) or with all or many minority students (72 percent) than other categories of schools. Proportionately fewer (43 percent) of the teachers in junior or middle schools thought dropouts were a serious problem (data not shown). Considering the ages included in this latter group of students, however, such a high proportion is yet another disquieting and potentially foreboding statistic.

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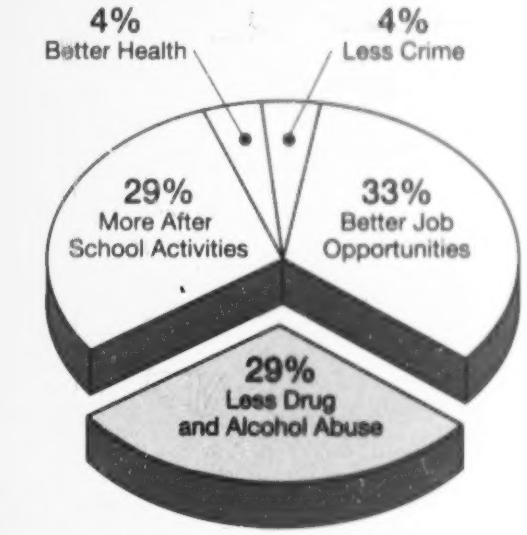
*Suicide was first with a 59 percent increase between 1985 and 1989.

### Table 3—Teachers' Perceptions of Student Drinking and Drug Use as Problems, United States, 1989

| Characteristic | Drinking | | | | Drug Use | | | |
|---|---|---|---|---|---|---|---|---|
| | Very Serious | Somewhat Serious | Not Very Serious | Not at All Serious | Very Serious | Somewhat Serious | Not Very Serious | Not at All Serious |
| | Percent | | | | Percent | | | |
| **Total** | | | | | | | | |
| 1985 | 27 | 39 | 20 | 13 | 14 | 44 | 29 | 11 |
| 1989 | 37 | 44 | 13 | 5 | 18 | 52 | 25 | 4 |
| **Grade Level** | | | | | | | | |
| Junior High | 22 | 48 | 20 | 9 | 14 | 51 | 28 | 6 |
| High School | 51 | 40 | 7 | 1 | 23 | 53 | 21 | 2 |
| **School Setting** | | | | | | | | |
| Urban | 30 | 45 | 18 | 7 | 14 | 60 | 21 | 5 |
| Inner City | 29 | 41 | 19 | 7 | 26 | 56 | 16 | 2 |
| Suburban | 36 | 42 | 14 | 7 | 20 | 50 | 24 | 4 |
| Small Town | 37 | 46 | 12 | 4 | 18 | 48 | 28 | 4 |
| Rural | 44 | 43 | 10 | 2 | 17 | 52 | 26 | 4 |
| **School Population** | | | | | | | | |
| All or many Minorities | 32 | 43 | 17 | 7 | 24 | 54 | 19 | 3 |
| Few or no Minorities | 41 | 43 | 12 | 4 | 18 | 48 | 28 | 5 |
| **Quality** | | | | | | | | |
| Fair or Poor | 46 | 36 | 15 | 3 | 32 | 53 | 15 | – |

Source: *The Metropolitan Life Survey of The America Teacher*, 1989, and Louis Harris and Associates, Inc., unpublished data.

**Figure B—Teachers' Views of Most Beneficial Community Changes for Education**



Source: *The Metropolitan Life Survey of the American Teacher, 1989.*

## Teenage Pregnancy

Pregnancy among 7th to 12th graders is another increasingly serious problem facing today's teachers. Between 1985 and 1989, the proportion rating this issue a serious problem rose 25 percent, increasing to 61 percent of all 7th to 12th grade teachers. Again, this problem was worse among teachers in schools with all or many minority students or in fair or poor quality schools. In 1989 three-quarters of the teachers in these settings considered teenage pregnancies a serious problem with proportionately more (41 percent, each) rating the issue "very serious."

## Substance Abuse

Student drug use and the amount of their drinking were considered the two most serious problems faced by teachers of grades 7 through 12 in 1989. The vast majority of teachers in all settings voiced these concerns and their proportions continue to increase (Table 3).

Student drug use and drinking were considered the two most serious problems faced by teachers of grades 7 through 12 in 1989.

Seventy percent of teachers in the higher grades said illegal drug use was a serious problem in their schools in 1989—58 percent thought so in 1985. This increase represents a relative jump of 21 percent for the group as a whole. Only 4 percent of the teachers surveyed thought drugs were not at all a serious problem in 1989 versus 11 percent in 1985. The largest proportion of teachers rating drugs a serious problem taught in schools of fair or poor quality or in inner-city schools, 85 and 82 percent, respectively. Teachers in schools with all or many minority students followed with 78 percent of these teachers voicing serious concerns over drugs.

Student drinking was even a greater problem. More than 8 out of 10 teachers

Student drinking was considered a serious problem by 81 percent of 7-12 grade teachers—up 23 percent from the 1985 measure.

in grades 7 through 12 were seriously concerned about student drinking in 1989. This jump from 66 percent in 1985 to 81 percent in 1989 represents a relative increase of 23 percent with the largest proportional increase (37 percent) evident for those rating this issue as *very* serious. Drinking is considered the most serious problem by high school teachers with almost all (91 percent) rating it serious; 51 percent considered it *very* serious and 40 percent rated it somewhat serious. As troubling, however, is that fully 70 percent of junior high school teachers consider drinking a serious problem in their schools, with 22 percent considering it a *very* serious problem. Rural area, small town and teachers in fair or poor quality schools followed with 87, 83 and 82 percent, respectively, rating drinking a serious problem.

## The Future

Teachers believe that the implementation of three basic changes in the school's community could significantly improve the education in their schools (Figure B). Better job opportunities, less drug and alcohol abuse and more after-school activities were listed with almost equal frequency as ways of positively influencing the educational climate in the schools. Together, these three changes accounted for more than 90 percent of the listed putative solutions.

In addition, teachers feel that expanded cooperation between the school and the local community is needed to help alleviate some of the societal problems facing today's students. Specifically, 84 percent of the teachers agree that the integration of health, education and social services in schools would be a "smart way of keeping at-risk students from slipping through the cracks." In addition, 90 percent feel that schools should mobilize these resources and be able to make appropriate referrals to outside agencies.

As is evident from the results of this latest survey of American public school teachers, the challenges facing today's educators are formidable. Optimism remains high, however, and solutions are proposed to help remedy some of the problems. MetLife and the Metropolitan Life Foundation will continue to monitor the situation and to emphasize the teacher as a key player in efforts to improve the quality of public education in America. □

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## References

[1] Metropolitan Life Insurance Company. The *Metropolitan Life Survey of the American Teacher.* New York: Louis Harris and Associates, Inc., 1984.

[2] Metropolitan Life Insurance Company. *The Metropolitan Life Survey of the American Teacher, 1985: Strengthening the Profession.* New York: Louis Harris and Associates, Inc., 1985.

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[5] Metropolitan Life Insurance Company. *The Metropolitan Life Survey of the American Teacher, 1987: Strengthening Links Between Home and School.* New York: Louis Harris and Associates, Inc., 1987.

[6] Metropolitan Life Insurance Company. *The Metropolitan Life Survey of the American Teacher, 1988: Strengthening the Relationship Between Teachers and Students.* New York: Louis Harris and Associates, Inc., 1988.

[7] Metropolitan Life Insurance Company. *The Metropolitan Life Survey of the American Teacher, 1989: Preparing Schools for the 1990s.* New York: Louis Harris and Associates, Inc., 1989.

# Commentary

## Social Climate in American Public Schools

Our children's education, especially adolescents, is increasingly threatened by the social climate in American schools. As shown in the preceding article, each year growing numbers of teachers report serious problems among school-aged children, including using alcohol and illegal drugs, becoming pregnant, committing suicide, or dropping out. Teachers know all too well the negative educational consequences these problems create. It is timely now for all Americans to realize their impact on our nation's future.

The United States needs an educated work force to compete in an increasingly technology-oriented world. How can future expectations and opportunities be met if our children's learning is stunted by substance abuse, adolescent childbearing, poor mental health, or when fully one-third of high school freshmen do not graduate?

### Social Problems Are Barriers to Learning

These questions need to be addressed by all concerned citizens, and especially by leaders in government and industry. Industrial leadership must acknowledge the need for its participation in planning programs that will produce educated future workers. Government leaders should take a fresh look at the social problems facing today's youth which create barriers to learning in America. Public-private partnerships must be formed to help teachers assure that today's students can effectively participate in tomorrow's work force, unencumbered by substance dependency, illiteracy, mental illness, or untimely-born children.

Public-private partnerships must be formed to help teachers assure that today's students can effectively participate in tomorrow's work force

### Needed: A National Social Ethic

A new national social ethic is also needed to encourage concern for, and recognition of, warning signs of future problem behaviors and to permit the implementation of appropriate intervention activities, when necessary. For instance, when a student is often absent from school the underlying reason must be determined. Is there a medical problem? Is the student caring for younger siblings or aged grandparents while the parent or parents work? Is there a financial or psychosocial reason for the truancy? Only by such determinations can the behavior be understood and appropriate intervention begun. Good attendance and promptness are cornerstones of productive employment. Schools can foster this ethic with reinforcement from leadership at home, and in the business and public sectors. Thus, prolonged absenteeism must be viewed as a serious problem, and dealt with directly. If not, escalating dropout rates can be expected, and with them a future replete with adults who are ill-prepared.

Educators are dedicated to our children's learning. Their gratification is to watch students succeed. Teachers, however, cannot produce successful outcomes in a vacuum. Integrated support from parents, business leaders, as well as the health and the helping professions must be part of the equation. Working together, it may be possible to change the course of young peoples' lives and provide new expectations of optimistic long-term goals for them, their children, and for their country.

*Martin C. Ushkow, M.D.*
*Chair, Committee on School Health*
*American Academy of Pediatrics*

# Measles in the United States: The Epidemic of 1989

Measles has been recognized for centuries, occurring virtually throughout the world. Before the development of a vaccine in 1963, measles had by far the highest reported incidence of all communicable diseases of childhood in the United States. Epidemics historically occurred every two or three years, with small localized outbreaks usually occurring in the interim.[1,2]

While many parents consider measles to be a relatively mild childhood ailment, it can often be serious and have potentially severe complications. In developing countries, it is estimated to account for between one and two million deaths each year.[3] In the United States, despite high immunization rates in childhood, measles is considered the most frequent cause of vaccine preventable deaths in children. During 1989, there were 45 fatalities associated with measles--the highest number of such deaths in this country in the last 18 years.[4]

Mortality from measles reached an 18-year high in 1989 with a reported total of 45 deaths.

Minor complications that frequently accompany the disease include middle ear infections, pneumonia, diarrhea and conjunctivitis. Encephalitis, a potentially severe complication, affects approximately one in every 1,000 measles cases. In addition, measles during pregnancy increases the risk of premature labor, spontaneous abortion and the possibility of congenital malformations.[5]

The development of a vaccine in 1963 brought about sharp decreases in the incidence of measles. Cases of this, heretofore, most contagious of all childhood diseases, dropped more than 98 percent between 1963 and 1986. While the goal of eradication of indigenous measles by 1982 has not yet been realized, the efficacy of total U.S. control efforts is widely acknowledged. This success has prompted many to suggest the targeting of measles for worldwide elimination, even as modifications regarding target populations and vaccination schedules continue to be recommended.[6-8]

The latest incidence data from the Centers for Disease Control (CDC) and historical measles data reported in the CDC publication Morbidity and Mortality Weekly Report (MMWR) provide the basis of the current update of measles in the United States.[9]

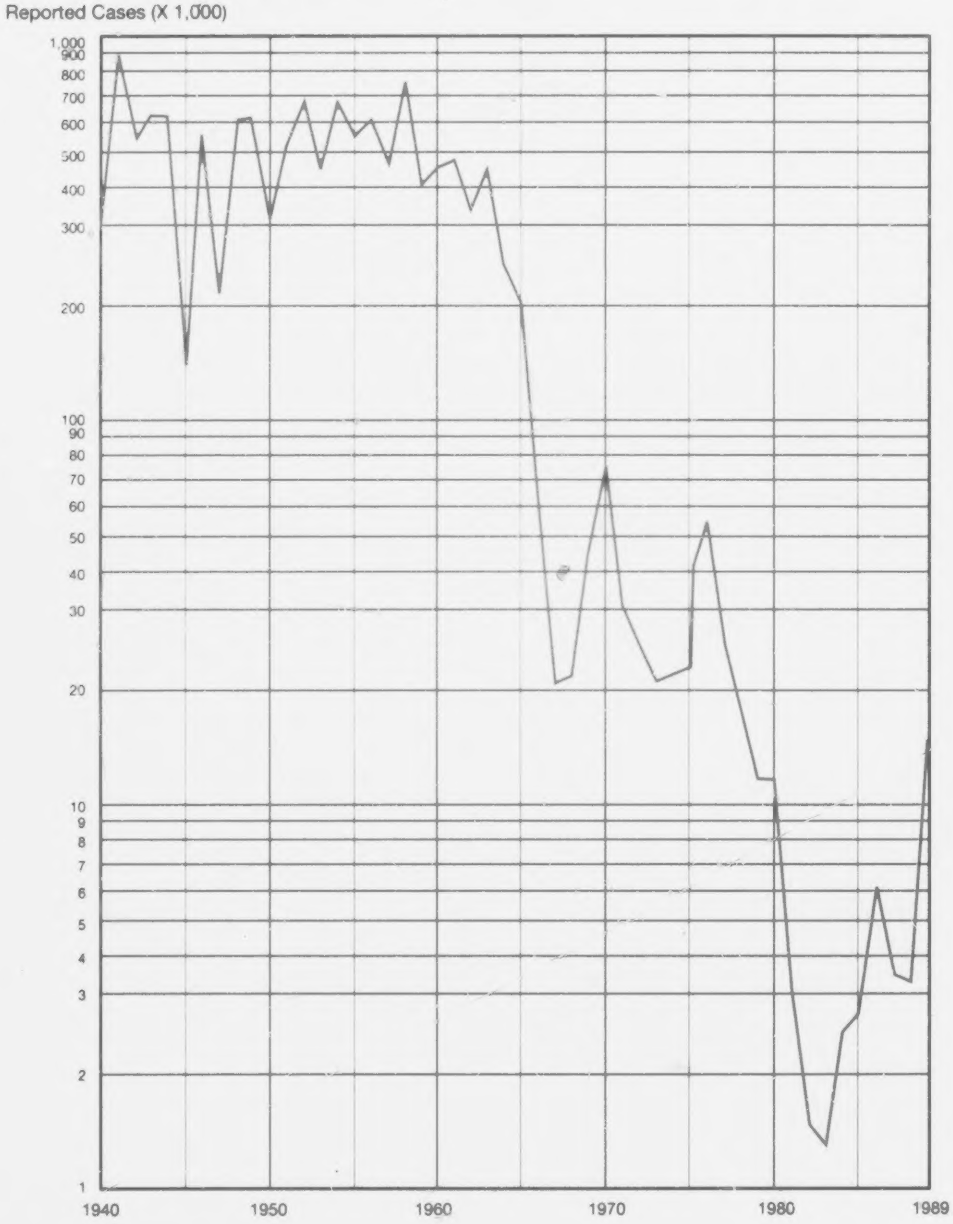
Measles cases reached a decade-high number in 1989 with a provisional total topping 16,000.

## Trends

Dramatic changes in the annual occurrence of measles have taken place over the years in the United States (Figure A). After reaching an all-time high in 1941 with 894,134 episodes reported, measles dropped 99.6 percent to 3,396 cases in 1988. Near the end of 1989, however, the number of cases had skyrocketed to 16,236, with a final total estimated to approach 17,000 cases.[4]

As the historical data clearly show, major fluctuations in the disease have taken place over the last five decades. Between 1958 and 1959 the number of cases dropped almost 50 percent, then rose nine percent to 441,703 in 1960. Measles

## Figure A—Reported Measles Incidence (X 1,000) United States, 1940-1989*



*1989 data are provisional.
Source: Centers for Disease Control, *MMWR* Annual Summaries.

again peaked in 1962 (481,530 cases) and remained over 200,000 cases each year through the mid-1960s. Following development of widespread immunization programs in the mid-1960s, the 1966 total was cut by almost 90 percent, dropping to 22,231 cases by 1968.

Despite the availability of a vaccine, measles rose steadily between 1968 and 1971 before another downturn occurred. This downturn was reversed between 1974 and 1977 when cases more than doubled, rising from 22,094 to 57,345 cases. Measles again dropped steadily through 1983 to the lowest number ever reported in the United States (1,497 cases).

Annually, measles numbered well below 10,000 during most of the 1980s. Cases ranged from 1,497 in 1983 (the year after indigenous measles was targeted for eradication in the United States) to 6,282 in 1986. Measles dropped for the next two years by 42 and 7 percent, respectively, but experienced a 378 percent increase in 1989--an increase unparalleled in the last 50 years.

## Regional Distributions

There was a provisional total of 16,236 measles cases in the United States at the end of 1989 (Table 1). This decade-high number was manifested by substantial increases in all but one region of the country. That one region was the Middle Atlantic where the number of measles cases remained virtually unchanged from 1988. With the exception of the South Atlantic states, cases at least doubled in the eight remaining areas. Three areas, East North Central, West North Central and West South Central, each reported increases of more than 1,000 percent over the 1988 totals. The 16 states in these three Central areas accounted for almost two-thirds (64 percent) of all the measles in the United States during 1989.

Hardest hit in 1989 was the East North Central area with almost 40 percent of the U.S. total (Figure B). Forty-four percent of these cases were reported in Ohio with Illinois contributing another 42 percent of the area's total. The CDC reports that more than half of the Illinois measles were among inner-city populations in Chicago and occurred among "primarily unvaccinated black and Hispanic preschool-aged children."[10]

Unvaccinated inner-city preschool-aged children are most prone to measles.

The West South Central area reported the second highest number with one-fifth of the country's measles. Texas accounted for 92 percent of the area's total due to a large measles outbreak in Houston. The Pacific area ranked third in measles with California accounting for 95 percent of these cases; the majority occurred in Los Angeles among inner-city preschoolers.

The fewest cases were reported in the East South Central and New England states. Together these areas reported less than four percent of the total for the country.

## State and Local Totals

During 1989 measles were reported in all but three states--North and South Dakota and Wyoming. In contrast, 15 states were without the disease in 1988 (Table 1).

Major outbreaks of measles occurred in Houston, Los Angeles and Chicago during 1989.[10] These epidemics resulted in totals for Texas, California and Illinois in excess of 2,000 cases each. Ohio was the only other state in the country in which measles cases totaled more than 2,000. These four states, together, accounted for more than two-thirds of the 1989 measles cases.

More than 2,000 cases of measles were reported in each of four states— Illinois, Texas, California and Ohio.

Among individual states, Texas led the nation with 19 percent of all measles cases. California, Ohio and Illinois followed, accounting for between 17 percent and 16 percent of the total U.S. measles. The Illinois total represents a 35-fold increase over the reported cases in 1988. Also of note is the fact that the 1989 Texas total was only 324 cases under that for the entire United States during 1988. The Texas sum also represents more than a tenfold increase over its 1988 number of cases. Nineteen other states registered over 100 measles cases each--more than twice the number of states with such totals in 1988.

Some other interesting changes occurred among the states between the years. While the nation as a whole experienced a dramatic increase in reported measles, eight states reported fewer cases in 1989 than in 1988. Among the states with more than 50 cases in 1988, the Virginia total dropped 91 percent, Montana cases were down some 85 percent, New Hampshire 84 percent, and Pennsylvania reported just over one-half its previous year's total.

As shown in Table 1, only a handful of states showed any apparent consistency in the occurrence of measles over the years. Six states, Texas, California, Ohio, New Jersey, New York and Pennsylvania were among the top 10 in measles cases in both 1989 and 1988. At the other end of the spectrum, not even one case of measles was reported in South Dakota over these years and Idaho, Alaska, and Wyoming were consistently among the 10 states with either zero or the lowest number of cases.

## Age of Onset

The age distribution of the 1989 measles outbreak differs from previous years (Table 2). Close to 40 percent of the 1989 cases occurred in children under five years of age with the vast majority (69 percent) reported among children aged one to four (data not presented). (In 1988, 29 percent of the measles cases were reported among children under five with almost equal proportions occurring among those aged 0 to 16 months and 16 months to four years, 53 and 47 percent, respectively—unpublished data). Although persons aged 15 to 19 are considered a "very highly vaccinated group," they accounted for the second largest proportion of cases (24 percent). Ten- to 14-year-olds--another very highly vaccinated group--followed with 12 percent of the cases.

Close to forty percent of measles was reported among children under age five.

As seen in Table 2, incidence rates more than tripled among all age groups in 1989. The largest jump in measles incidence occurred among children under 5 where the rate was slightly more than 6 times higher in 1989 than in 1988. This increase was followed closely by a five-fold rise in incidence among 20- to 24-year-olds. For the country as a whole, measles incidence increased 372 percent between 1988 and 1989.

## Table 1—Reported Cases of Measles United States, 1978 and 1987-1989

| | Rank | 1989* | 1988 | 1987 | 1978 |
|---|---|---|---|---|---|
| UNITED STATES | | 16,236 | 3,396 | 3,655 | 26,871 |
| New England | | 383 | 128 | 282 | 2,046 |
| Maine | (46) | 1 | 7 | 3 | 1,320 |
| New Hampshire | (39) | 16 | 100 | 163 | 82 |
| Vermont | (45) | 3 | – | 26 | 55 |
| Massachusetts | (23) | 108 | 6 | 66 | 253 |
| Rhode Island | (32) | 40 | – | 2 | 8 |
| Connecticut | (12) | 215 | 15 | 22 | 328 |
| Middle Atlantic | | 1,037 | 1,040 | 602 | 2,288 |
| New York | (9) | 322 | 97 | 512 | 1,844 |
| New Jersey | (7) | 433 | 405 | 39 | 72 |
| Pennsylvania | (10) | 282 | 538 | 51 | 372 |
| East North Central | | 6,222 | 273 | 396 | 11,599 |
| Ohio | (3) | 2,720 | 109 | 5 | 492 |
| Indiana | (22) | 112 | 57 | – | 227 |
| Illinois | (4) | 2,586 | 72 | 212 | 1,381 |
| Michigan | (8) | 344 | 31 | 32 | 8,006 |
| Wisconsin | (6) | 460 | 4 | 147 | 1,493 |
| West North Central | | 854 | 77 | 232 | 583 |
| Minnesota | (35) | 27 | 11 | 39 | 46 |
| Iowa | (41) | 13 | 1 | – | 73 |
| Missouri | (5) | 561 | 65 | 190 | 154 |
| North Dakota | | – | – | 2 | 211 |
| South Dakota | | – | – | – | – |
| Nebraska | (21) | 113 | – | – | 5 |
| Kansas | (16) | 140 | – | 1 | 94 |
| South Atlantic | | 776 | 439 | 188 | 5,572 |
| Delaware | (30) | 43 | – | 32 | 7 |
| Maryland | (19) | 115 | 19 | 10 | 51 |
| District of Columbia | (31) | 42 | – | 1 | 48 |
| Virginia | (36) | 22 | 239 | 1 | 2,837 |
| West Virginia | (27) | 53 | 6 | – | 1,066 |
| North Carolina | (13) | 190 | 5 | 6 | 125 |
| South Carolina | (40) | 15 | – | 2 | 199 |
| Georgia | (38) | 18 | – | 10 | 36 |
| Florida | (11) | 278 | 170 | 126 | 1,203 |
| East South Central | | 255 | 71 | 8 | 1,409 |
| Kentucky | (29) | 44 | 36 | – | 122 |
| Tennessee | (14) | 150 | – | – | 952 |
| Alabama | (25) | 60 | – | 4 | 102 |
| Mississippi | (46) | 1 | 35 | 4 | 233 |
| West South Central | | 3,339 | 296 | 456 | 1,454 |
| Arkansas | (36) | 22 | 1 | – | 17 |
| Louisiana | (18) | 119 | 1 | – | 385 |
| Oklahoma | (17) | 126 | 8 | 4 | 19 |
| Texas | (1) | 3,072 | 286 | 452 | 1,033 |
| Mountain | | 418 | 209 | 496 | 257 |
| Montana | (41) | 13 | 86 | 128 | 88 |
| Idaho | (44) | 7 | 1 | – | 1 |
| Wyoming | | – | – | 2 | – |
| Colorado | (24) | 99 | 116 | 9 | 50 |
| New Mexico | (34) | 31 | – | 317 | – |
| Arizona | (15) | 145 | 4 | 36 | 57 |
| Utah | (20) | 114 | 2 | 1 | 44 |
| Nevada | (43) | 9 | – | 3 | 17 |
| Pacific | | 2,952 | 863 | 995 | 1,663 |
| Washington | (27) | 53 | 7 | 47 | 442 |
| Oregon | (25) | 60 | 7 | 132 | 562 |
| California | (2) | 2,806 | 836 | 810 | 649 |
| Alaska | (46) | 1 | 2 | 1 | 1 |
| Hawaii | (33) | 32 | 11 | 5 | 9 |

*1989 data are provisional.
Note: Number in parenthesis denotes 1989 ranking of states.
Source: Centers for Disease Control, *MMWR* Annual Summaries, 1978-[illegible]

Figure B—Percent Distribution of 1989* Measles Cases by Geographic Area

United States Total = 16,236

New England
2%

*1989 data are provisional.
Source: Table 1.

## Control Efforts

The more than fourfold increase in measles cases in 1989, the large outbreaks among unvaccinated preschool-aged children in inner cities and among vaccinated high school and college students led to implementation of aggressive outbreak control strategies in many parts of the country. The CDC reports intensified surveillance in outbreak areas and lowering vaccination age during outbreaks to 12 months. These and additional efforts must be encouraged plus long-term outreach programs developed to motivate families to seek out and use available health resources so that all eligible children receive the proper immunization. Such vaccination should help prevent outbreaks and greatly decrease the risk of transmission of measles to infants too young for the vaccine.

To help counter the estimated 5 percent vaccine failure rates, the Immunization Practices Advisory Committee now recommends a two-dose vaccine regimen.[11] For children in non high-risk areas, the first dose is to be administered at 14-15 months followed by a second dose upon school entry (between four and six years of age). In areas of recurrent measles

## Table 2—Reported Cases of Measles and Incidence Rates* by Age Group United States, 1988 and 1989

| | 1989† | | | 1988† | | |
|---|---|---|---|---|---|---|
| Age | Number | Percent | Rate | Number | Percent | Rate |
| 0-4 | 6,035 | 37.5 | 32.4 | 978 | 28.7 | 5.3 |
| 5-9 | 1,491 | 9.3 | 8.2 | 312 | 9.1 | 1.7 |
| 10-14 | 1,969 | 12.2 | 11.7 | 576 | 16.9 | 3.5 |
| 15-19 | 3,889 | 24.1 | 21.3 | 1,054 | 30.9 | 5.8 |
| 20-24 | 1,337 | 8.3 | 6.8 | 252 | 7.4 | 1.3 |
| 25 & over | 1,387 | 8.6 | .9 | 239 | 7.0 | .2 |
| Total | 16,108 | 100.0 | 6.5 | 3,411 | 100.0 | 1.4 |

* Rate per 100,000.

† Provisional totals reported to Division of Immunology, CDC.

Note: Totals differ from those in Table 1 due to missing or incomplete data reported.

Source: Centers for Disease Control. 1989 rate computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on data from the Centers for Disease Control and Bureau of the Census.

transmission, the first dose should be administered at 12 months of age. In addition to such immunization modifications, it is recommended that colleges and other educational institutions require that all entering students born after 1956 have proof of two-doses of measles vaccine after age one.[9-11] These activities should result in a more highly immune population which, in turn, should greatly aid in the eradication of measles in this country. □

Two-dose vaccination schedule is being recommended starting at 15 months and repeated at school entry (ages four to six years).

*Note: The editors wish to acknowledge and thank Dr. William Atkinson of the Division of Immunization, CDC, for his help in providing unpublished data and for reviewing this text.*

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# Commentary
## Measles... Again

In 1896 when Dr. Chapin was the Health Commissioner of Providence, R.I., the city's governing board asked him to bring a plan to the next meeting to cut his department's next annual budget by 10 percent. His presentation to the board was accompanied by a map of Providence's electoral districts. He said to the board, "If you tell me in which districts you want the excess typhoid deaths next year, I can make those cuts." The board voted not to cut the department's budget.

Measles outbreaks in several American cities during the first quarter of 1990 occurred without public health advice such as that given by Dr. Chapin. Through February, there were over 1,600 measles cases compared with 600 at the same time last year. The increases were mainly in Chicago, Dallas, Los Angeles, and Milwaukee. Smaller outbreaks have also been recorded in 15 other cities thus far in 1990.

This 250 percent increase is shocking for a disease believed to be virtually eradicated nine years ago. Framed in 1979, the measles Health Objective for the Nation 1990 was *500 cases nationally*. There may be even worse news coming.

**ITEM.** The Centers for Disease Control expect that March through May (not January and February) will be 1990's worst months.

**ITEM.** Measles deaths in the first two months of 1990 were estimated by CDC as 15-20, whereas the annual total for 1989 was 45.

**ITEM.** The total number of cases for 1989, over 17,000, was the highest in 10 years—a total likely to be surpassed this year.

What has caused this reversal of public health results? A combination of issues are involved.

**ITEM.** The low immunization rates for preschool age children indicate that parental ignorance and apathy are indeed factors, but service delivery problems also exist.

**ITEM.** Inaccessible public immunization clinics or long waiting lines have become a widely recognized fact of life in U.S. public health.

**ITEM.** Most, but not all, states require immunization before a child can enter elementary school, but allow the same child to enter preschool programs without adequate immunization.

**ITEM.** These previously mentioned 1989-90 measles outbreaks are among inner-city preschoolers, presumably of working mothers who cannot get their children to daytime clinics. They need to be identified and their high-risk children aided.

**ITEM.** Federal and state budget constraints are also factors. Consider the federal administration's immunization program reauthorization request for fiscal year 1991–$131 million. That is $25 million less than the 1990 congressional appropriation. Congressman Waxman estimates $185 million is needed.

### Changes in Requirements

Recent research on measles immunization has shown that not one, but two doses are required. State laws should be rapidly changed to reflect this recommendation. Because the present epidemic is chiefly among poor, inner-city preschool children, they may be unaffected by changes in dosage schedules unless immunization statutes require their protection too.

None of these changes will take place in an era of rising governmental deficits until either strong public demand or effective public policy leadership emerges. Where will the 1990's counterpart of Dr. Chapin arise? It must be from informed individuals who understand the stakes, and will move aggressively *now* to control childhood measles.

***Charles B. Arnold***
*Editor*

# Capsule Briefs
## are timely selections with broad reader interest

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## Growing Older Gracefully

If you want to know how men reach age 65 in good health, these authors may help. This article is the most recent in a series of reports on a rare cohort of 173 men now followed carefully from ages 18 to 65. The most powerful negative predictor of both mental and physical health at age 65 was the extent of depression (as indicated by tranquilizer use) before age 50. Another important predictive factor was the maturity of coping mechanisms before age 50. This lengthy study shows that successful life adjustment at age 65 is preceded by years of personal preparation. (Vaillant, G.E. and Vaillant, C.O., **Am J Psychiatry**, 1990, 147:31-37.) □

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## Nibblers of the World: Here's Positive Reinforcement

If frequent eating (nibbling) is your thing, then these investigators have news to assuage any possible guilt you have. In a cross-over design, seven men were given the same diet for two different two-week intervals (separated by another two-week interval). Maintaining the same activity levels throughout, in one time-period they ate three meals a day; in the other time-period they ate exactly the same diet constituents, but in 17 portions each day. Serum cholesterol and other blood values, including lipids, were much better during the nibbling diet. One conclusion: eat the same, but do it more often, and be healthier. (Jenkins, D.J.A., Wolever, T.M.S., and Vuksan, V., *et al*, **New Eng J Med**, 1989, 321:929-34.) □

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## More About My Daughter the Doctor

Female medical residents, in this extensive survey (by Drs. Leah Dickstein and Allison Batchelor) of 1,120 such young women, were frequently found to have serious personal problems. One was complaint of sexual harassment and sexual discrimination by patients, patients' families, and attending physicians. Their lives were also complicated by weekly schedules with heavy work loads; low pay; absence of women role models and women mentors; and separation from significant others because of schedules and geographic distance. It is not surprising that serious emotional problems were reported in nearly 12 percent. (Page, L., **Am Med News**, December 8, 1989, p.10.) □

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## Can Preventive Care Occur in Private Doctors' Offices?

The answer is yes, based on this multi-site, lengthy study of private physicians in Project INSURE. A significant proportion of patients whose doctors participated subsequently reported that they had changed to healthier lifestyles, including routine seatbelt use; regular exercise; weight loss; decreased alcohol intake; and among women, monthly breast self-examination. A greater, but not significant, percentage of the study group also quit smoking. (Logsdon, D.N., Lazaro, C.M., and Meier, R.V., **Am J Prev Med**, 1989, 5:249-56.) □

## Alzheimer's Disease: More Common Than Suspected?

This East Boston survey found the point-prevalence of Alzheimer's disease to be 10.3 percent, higher than in other U.S. surveys, but comparable to three previous European studies. The rate increased with age—3.0 percent from 65-74 years, 18.7 percent between 75-84 years, and 47.2 percent for age 85 and over. These high rates are not without methodological controversy due to the way the disease was estimated, and to some social features of the East Boston community. Nevertheless, the authors have reminded the nation and its physicians of further complexities to be expected as the population ages. (Evans, D.A., Funkenstein, H.H., Albert, M.S., *et al*, **JAMA**, 1989, 262:2551-2556; see also related editorial by Larson, E.B., *ibid*, pp. 2591-92.) □

## Radon's Two Faces: Risk Assessment and Response

How to assess the risk of radon gas, a low-level radioactive gas that is widely distributed naturally in soil and rocks, and also a product of contamination by radioactive wastes? The public cumulative health effects from low-level exposure to radioactive gas are scientifically unknown at present. Since long-term exposure to inhaled radioactive particles is a proven risk factor for lung cancer, public fears have been aroused that radon gas may also increase the risk of cancer. Further, publicized expert estimates of annual cancer deaths from radon have ranged from 5,000 to 20,000. This article on radiation and health is part of an excellent symposium on risks of low-level radioactivity—recommended reading for those needing current information on this complex subject. (Hall, E.J., **Bull NY Acad Med**, 1989, 65:430-438.) ...The proper public policy response at this time may be watchful waiting as stated by this environmental policy scientist, who believes expressed public concern over radon risk may be premature. Until those risks are better established, he reasons, citizens may be made needlessly anxious, and public funds may be diverted to solve a non-problem. (Cole, L.A., **The Sciences**, 1990, 30:19-23.) □

## Perception of Stress as Predictor of Death

Psychological distress as measured by the Health Opinion Survey is indeed unhealthy, according to this careful 12-year follow-up epidemiological study by North Carolina researchers of 610 persons living in Evans County, GA. The hazard ratio (for death) was significantly higher when the group scoring in 95th percentile's mortality was compared with those scoring at the median. The analysis controlled for age, race, and sex as well as smoking, serum cholesterol, body-mass, diastolic blood pressure, social networking, social class, and severe chronic illnesses. In addition, it omitted any persons who died in the first half of the follow-up period to eliminate any possible confounding effects from terminal illness. Inference: learn to cope effectively with stress before it gets you. (Somervell, P.D., Kaplan, B.H., Heiss, G., *et al*, **Am J Epid**, 1989, 130:1013-23.) □

# International Comparison of Mortality From Suicide

Over 30,000 Americans committed suicide last year, making it the eighth leading cause of death. Suicide is also a major problem in several other Western developed countries. While the number of suicides in these countries pales when compared with heart and cancer mortality, virtually every such death is considered preventable.

> The number of suicides pales when compared with heart and cancer mortality.

Further, the shock and grief felt by loved ones and friends endure long after the event, often in a way unlike that from deaths caused by organic diseases. This grief reaction is usually heightened by an awareness that the victim gave signals of suicide intention before the event, which were either ignored or misunderstood. Importantly, suicide prevention has become the object of considerable research, especially in relation to psychological depression.[1 2]

> Suicide prevention has become the object of considerable current research, especially in relation to psychological depression.

Suicide is universal--it occurs in every country, although its pattern exhibits substantial international variability. In the United States, suicide accounts for around 1.5 percent of all deaths or approximately 30,000 to 31,000 lives annually in the past three years. Specifically, it is estimated that in 1989 almost 31,000 persons committed suicide compared with a provisional total of 30,260 in1988 and a final count of 30,796 in 1987. Unfortunately, these figures are widely believed by experts to be significantly understated, in part because of the stigma that society still attaches to taking one's own life.[3]

## United States Experience

In the United States suicide is primarily committed by whites and, most often, by men. According to 1987 data, 92 percent of all suicides occurred among white persons and 79 percent of the total were among men. Additionally, fully 45 percent of the deaths from suicide occurred at ages 45 and over. Of the balance, more than one-fifth of the total were aged 25-34 and a sixth were in each of the 35-44 and 15-24 age brackets. A recent *SB* article presented a comprehensive mortality analysis of the profile of suicides in the United States.[4]

> According to 1987 data, 92 percent of all suicides occurred among white persons and 79 percent of the total were among men.

## International Differences

The purpose of this article is to examine the trend of mortality from suicide in the United States and compare it with that in Canada, Europe, and other developed countries.* The analysis is based primarily on data supplied by the World Health Organization

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*Data for the USSR is not available.

# Table 1—Suicide Rates by Sex and Age
# 1987 or Latest Available Year

(Death Rate per 100,000)

| | Men | | | | | | | Women | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | 15-74* | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 15-74* | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 |
| North America | | | | | | | | | | | | | | |
| United States | 24.3 | 21.3 | 24.8 | 22.9 | 23.8 | 26.6 | 34.8 | 6.5 | 4.3 | 5.9 | 7.2 | 8.5 | 7.7 | 7.2 |
| Canada | 27.9 | 25.5 | 30.9 | 25.7 | 30.1 | 26.3 | 30.9 | 7.7 | 5.0 | 7.7 | 9.0 | 10.0 | 8.2 | 7.6 |
| **Europe** | | | | | | | | | | | | | | |
| **Denmark†** | **40.3** | **16.5** | **33.2** | **50.6** | **54.3** | **82.2** | **52.9** | **21.8** | **5.2** | **14.0** | **24.6** | **36.7** | **44.2** | **29.3** |
| **Finland†** | **52.3** | **35.1** | **51.7** | **57.3** | **74.2** | **49.7** | **55.8** | **13.5** | **8.9** | **12.8** | **12.7** | **19.9** | **13.6** | **20.1** |
| **Norway†** | **25.6** | **20.5** | **27.0** | **25.8** | **29.7** | **29.3** | **22.8** | **9.3** | **¶** | **¶** | **12.0** | **16.8** | **12.4** | **13.6** |
| **Sweden†** | **30.7** | **19.5** | **29.4** | **33.8** | **38.8** | **36.1** | **39.3** | **12.2** | **7.9** | **11.0** | **14.6** | **15.4** | **15.3** | **12.7** |
| **Netherlands†** | **15.7** | **8.1** | **15.2** | **15.3** | **19.6** | **22.6** | **25.5** | **9.5** | **3.6** | **9.1** | **10.9** | **13.6** | **13.5** | **12.5** |
| **Weighted Average** | **29.1** | **16.3** | **26.8** | **31.4** | **37.3** | **35.7** | **36.3** | **13.0** | **5.3** | **10.2** | **14.0** | **18.5** | **18.1** | **16.1** |
| **United Kingdom** | | | | | | | | | | | | | | |
| **England & Wales** | **13.8** | **9.3** | **14.6** | **14.6** | **15.0** | **17.8** | **15.8** | **4.8** | **2.1** | **3.8** | **4.6** | **7.8** | **7.3** | **8.1** |
| **Northern Ireland** | **10.0** | **¶** | **¶** | **¶** | **¶** | **¶** | **¶** | **4.7** | **¶** | **¶** | **¶** | **¶** | **¶** | **¶** |
| **Scotland** | **18.7** | **14.4** | **19.8** | **22.9** | **20.7** | **16.8** | **17.8** | **6.7** | **¶** | **7.0** | **7.1** | **¶** | **13.1** | **¶** |
| **France†** | **35.8** | **16.0** | **34.2** | **38.1** | **46.3** | **47.8** | **63.5** | **13.4** | **4.6** | **10.1** | **14.4** | **20.2** | **21.2** | **25.4** |
| **Germany,F.R.** | **27.8** | **17.6** | **24.3** | **27.7** | **35.2** | **37.5** | **43.9** | **10.6** | **4.5** | **7.8** | **10.4** | **15.6** | **17.4** | **23.2** |
| **Switzerland** | **38.8** | **27.7** | **37.3** | **41.3** | **44.5** | **43.3** | **56.7** | **13.8** | **8.2** | **11.8** | **13.8** | **15.1** | **18.7** | **30.0** |
| **Weighted Average** | **32.3** | **17.2** | **28.8** | **32.7** | **39.0** | **41.1** | **51.0** | **13.1** | **4.7** | **8.9** | **12.2** | **16.8** | **18.8** | **23.4** |
| Austria | 44.1 | 29.3 | 42.9 | 44.8 | 51.9 | 48.5 | 68.1 | 14.9 | 8.1 | 10.7 | 15.9 | 16.8 | 22.9 | 33.8 |
| Belgium† | 32.9 | 15.5 | 30.0 | 37.0 | 40.3 | 42.1 | 62.9 | 15.2 | 5.5 | 10.1 | 19.3 | 22.1 | 24.2 | 24.9 |
| Czechoslovakia† | 33.7 | 14.2 | 32.1 | 37.2 | 45.5 | 46.0 | 53.5 | 10.2 | 4.1 | 7.9 | 8.8 | 14.9 | 17.1 | 22.5 |
| Hungary | 74.5 | 24.3 | 67.3 | 89.3 | 111.5 | 96.6 | 118.4 | 24.8 | 10.3 | 17.9 | 25.8 | 33.7 | 37.3 | 56.5 |
| Ireland† | 17.5 | 14.0 | 18.7 | 13.1 | 17.7 | 28.3 | 20.5 | 5.7 | ¶ | ¶ | ¶ | ¶ | ¶ | ¶ |
| Italy‡ | 12.3 | 5.2 | 9.2 | 10.1 | 14.8 | 22.0 | 33.7 | 4.4 | 1.3 | 2.7 | 4.3 | 5.9 | 8.8 | 11.8 |
| Portugal | 15.5 | 9.1 | 12.0 | 15.9 | 17.8 | 22.8 | 33.1 | 5.0 | 2.8 | 4.4 | 5.3 | 5.9 | 7.7 | 7.8 |
| Other | | | | | | | | | | | | | | |
| Australia† | 24.3 | 21.2 | 28.3 | 23.5 | 23.1 | 24.6 | 27.1 | 7.3 | 5.4 | 6.3 | 7.5 | 10.8 | 8.3 | 7.6 |
| New Zealand† | 24.0 | 22.9 | 20.5 | 27.9 | 24.7 | 25.2 | 25.3 | 9.6 | 8.0 | 8.0 | ¶ | ¶ | ¶ | ¶ |
| Hong Kong | 14.9 | 7.2 | 11.8 | 14.4 | 14.4 | 23.4 | 42.4 | 10.8 | 4.5 | 9.9 | 11.5 | 14.6 | 10.7 | 26.8 |
| Japan | 28.4 | 11.6 | 23.7 | 29.4 | 45.5 | 40.5 | 42.1 | 13.0 | 6.5 | 9.9 | 10.9 | 16.9 | 21.2 | 31.1 |
| Singapore | 16.3 | 8.3 | 16.4 | 12.9 | ¶ | 25.2 | 46.2 | 12.0 | ¶ | 13.0 | 12.3 | ¶ | ¶ | ¶ |

* Adjusted on basis of age distribution of the U.S. total population, 1940.
† 1986 data.
‡ 1985 data.
¶ Fewer than 20 deaths; rate not shown.
Source of basic data: *1988 World Health Statistics Annual,* Table 10.
World Health Organization and various reports from the United States and Canada.

and is tabulated according to the International Classification of Diseases Codes E950-E959. Death rates are shown in 10-year age brackets, with the rate for ages 15-74 being adjusted for the variation in each country's age distribution in order to make comparison between nations valid. These differences in magnitude of the rates from country to country may be influenced not only by differences in the actual level of suicides but also by such factors as differences in death registration procedures, in ways of recording deaths, in the completeness of both the numerator and the denominator data used to compute the rates, and other factors.[5]

> It is appropriate that U.S. mortality experience be measured against a mix of industrialized countries like those of Western Europe.

International comparisons of mortality rates provide a broader context to view a public health problem such as suicide. It is appropriate, however, that U.S. mortality experience be measured against a mix of industrialized countries like those of Western Europe (the United Kingdom, France, Germany and Switzerland). These nations, taken together, demographically resemble the United States in population size, geographic diversity, degree of industrialization, variety of ethnic and cultural stock, and range of socioeconomic conditions.

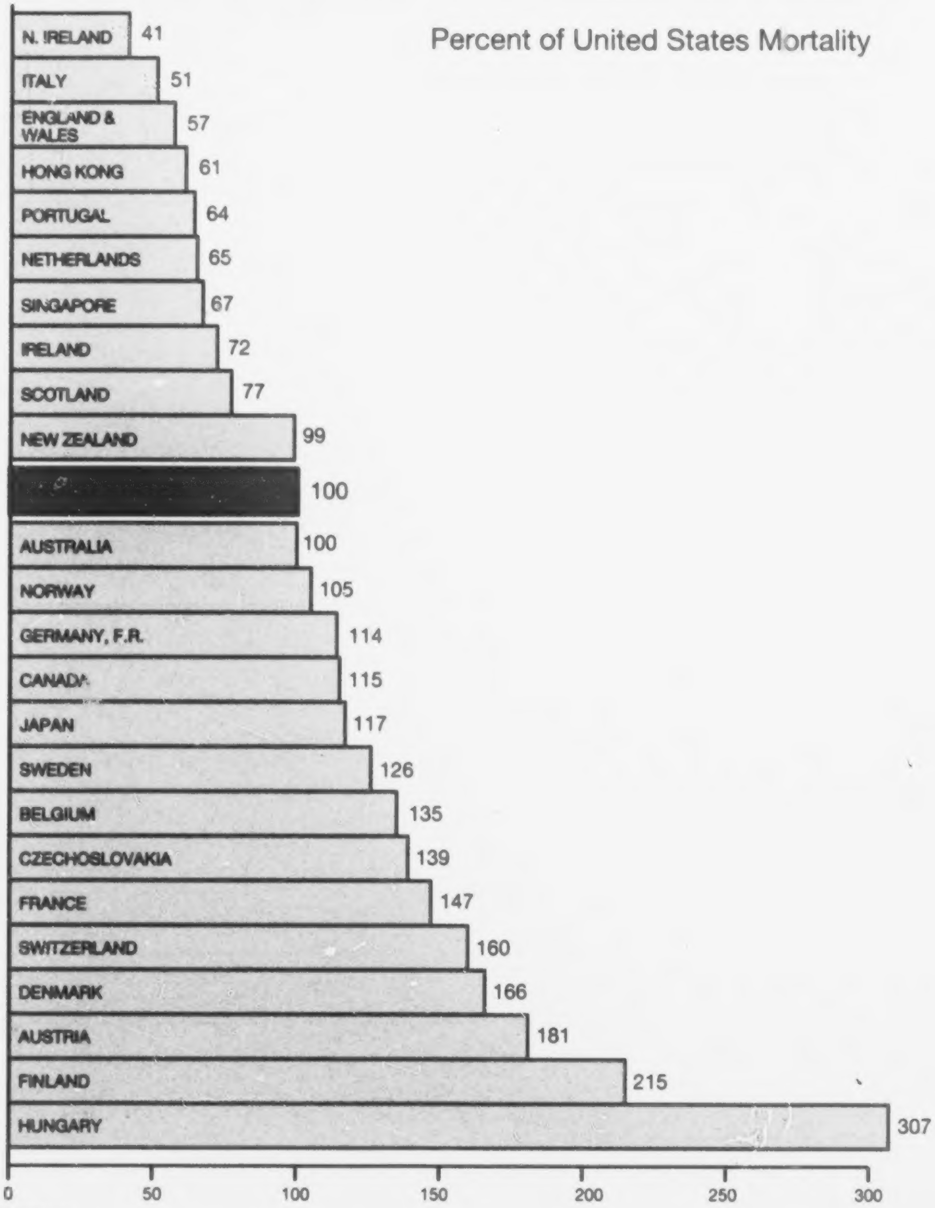
## Wide Differences Among Countries

Among the developed countries of the world, there are marked disparities in mortality rates from suicide. As shown in Table 1, the age-adjusted death rates for men aged 15-74 ranged from a high of 74.5 per 100,000 in Hungary to a low of just 10.0 per 100,000 in Northern Ireland. Among women at these ages, the national differences in age-adjusted mortality rates were not as wide. More notably, the rates were much smaller than the comparable rates for men. Thus, for women aged 15-74 the highest age-adjusted suicide rate was 24.8 per 100,000 in Hungary while the lowest was 4.4 in Italy. Both rates were just about one-third those for men. In the United States among persons aged 15-74, the 1987 death rate from suicide was 24.3 per 100,000 for men, or nearly four times the rate of 6.5 per 100,000 for women. At the same time, the suicide rates for men and women in Canada (27.9 per 100,000 and 7.7 per 100,000, respectively) were somewhat larger than those in the United States, but the sex disparity was fractionally smaller. Taken as a group, the mortality rate in the Scandinavian countries averaged 29.1 per 100,000 for men and 13.0 per 100,000 for women. Among the highly industrialized countries of Western Europe, the age-adjusted suicide rates were slightly higher–namely, 32.3 per 100,000 among men and 13.1 per 100,000 among women.

> In the United States, among persons aged 15-74, the 1987 death rate from suicide was 24.3 per 100,000 for men—nearly four times the rate of 6.5 per 100,000 for women.

Men commit suicide far more frequently than women. In addition to the previously mentioned national differences in mortality

## Relative Suicide Mortality, Men Aged 15-74
## United States Compared With Selected Countries
## 1987 or Latest Available Year



Source: Table 1.

rates by sex, in almost every other country the age-adjusted suicide rate for men was at least double that for women. The only exceptions were in Hong Kong, Singapore, the Netherlands and Denmark. In these countries, the ratio of male to female death rates ranged from 1.4 to 1.8. In Finland, the sex ratio was 3.9--the highest of any nation reviewed.

Men commit suicide far more frequently than women.

## Comparison With United States

Arranged in order of magnitude, the United States has one of the lowest suicide rates in the world. This may be seen from the figure that presents age-adjusted mortality rates for individual countries in comparison with the United States. Among men aged 15-74, of the 25 nations under review, the only European countries with lower death rates than the United States were Northern Ireland, Italy, England and Wales, Portugal, the Netherlands, Ireland, and Scotland. The death rates were virtually the same as in the United States in the oceanic nations of Australia and New Zealand but were considerably lower in Singapore and Hong Kong. In Japan, the mortality rate for men was somewhat higher than in the United States. After Hungary, Finland had the dubious distinction of experiencing the highest suicide rate among men (52.3 per 100,000). Following in rank order were the rates in Austria and Denmark.

The United States has one of the lowest suicide rates in the world.

## Changes by Age

With advance in age, mortality rates from suicide exhibit no consistent international pattern. According to the most recent data for men, the 1987 age-specific death rates for those in the United States remained in a narrow range between ages 15-64--namely from 21.3 per 100,000 at ages 15-24 to 26.6 per 100,000 at ages 55-64. For men aged 65-74 the mortality rate from suicide was 34.8 per 100,000. In Canada, throughout the various age groupings, the death rates varied from around 26 per 100,000 to about 31 per100,000. The mortality pattern in the Scandinavian countries and the Netherlands, as a group, was, for the most part, similar to that in Canada. However, within this category the death rates among men in Denmark and Finland fluctuated considerably. Age-specific death rates from suicide among men in the highly industrialized countries of Western Europe gradually increased with age. Specifically, the suicide rate at ages 15-24 was 17.2 per 100,000 and steadily rose to reach 51.0 per 100,000 at ages 65-74. Among the other European countries, the death rates also tended to rise with age. In Hungary, the age-specific rates for men (except at ages 15-24) and women (except at ages 45-64) were higher than those in any other country (in most instances markedly higher) and they have been in this unenviable position for a number of years.

The mortality pattern in the Scandinavian countries and the Netherlands, as a group, was similar to that in Canada.

# Table 2—International Trend, Age-Adjusted Suicide Rates by Sex Ages 15-74*, 1960-64 to 1987 or Latest Available Year

(Death Rate per 100,000)

| Country | Men 1960-64 | Men 1970-74 | Men 1980-84 | Men 1987 | Women 1960-64 | Women 1970-74 | Women 1980-84 | Women 1987 |
|---|---|---|---|---|---|---|---|---|
| North America | | | | | | | | |
| United States | 21.4 | 23.0 | 23.5 | 24.3 | 7.3 | 9.1 | 7.1 | 6.5 |
| Canada | 17.1 | 24.8 | 28.1 | 27.9 | 5.1 | 9.8 | 8.6 | 7.7 |
| **Europe** | | | | | | | | |
| **Denmark** | **30.7** | **36.5** | **44.4** | **40.2†** | **15.6** | **20.5** | **23.6** | **21.8†** |
| **Finland** | **46.7** | **49.6** | **49.6** | **52.3†** | **12.2** | **12.5** | **12.1** | **13.5†** |
| **Norway** | **14.2** | **16.9** | **25.4** | **25.6†** | **3.7** | **6.0** | **9.0** | **9.3†** |
| **Sweden** | **30.8** | **34.9** | **31.0** | **30.7†** | **11.3** | **13.6** | **12.9** | **12.2†** |
| **Netherlands** | **9.6** | **12.3** | **15.9** | **15.7†** | **6.0** | **8.3** | **9.9** | **9.5†** |
| **United Kingdom** | | | | | | | | |
| **England & Wales** | **15.7** | **11.3** | **13.7** | **13.8** | **9.9** | **7.0** | **6.4** | **4.8** |
| **Northern Ireland** | **8.1** | **6.2** | **12.1** | **10.0** | **4.5** | **4.3** | **6.0** | **4.7** |
| **Scotland** | **13.4** | **12.4** | **17.6** | **18.7** | **7.3** | **7.5** | **7.6** | **6.7** |
| **France** | **26.5** | **26.0** | **33.2** | **35.8†** | **8.2** | **9.4** | **12.2** | **13.4†** |
| **Germany, F. R.** | **30.8** | **33.2** | **32.2** | **27.8** | **14.2** | **15.5** | **13.5** | **10.8** |
| **Switzerland** | **32.6** | **33.7** | **41.7** | **38.8** | **12.2** | **13.0** | **16.2** | **13.8** |
| Austria | 38.5 | 40.3 | 46.6 | 44.1 | 14.7 | 14.5 | 14.9 | 14.9 |
| Belgium | 20.9 | 22.4 | 33.1 | 32.9† | 8.2 | 10.4 | 16.2 | 15.2† |
| Czechoslovakia | 37.2 | 43.2 | 35.5 | 33.7† | 14.1 | 13.3 | 9.9 | 10.2† |
| Hungary | 45.4 | 61.5 | 73.4 | 74.5 | 17.7 | 20.6 | 25.3 | 24.8 |
| Ireland | 5.2 | 6.5 | 14.2 | 17.5† | 1.5 | 2.2 | 6.0 | 5.7† |
| Italy | 9.3 | 9.0 | 11.1 | 12.3‡ | 4.0 | 4.0 | 4.5 | 4.4‡ |
| Portugal | 19.3 | 15.8 | 15.1 | 15.5 | 5.0 | 4.4 | 5.7 | 5.0 |
| Other | | | | | | | | |
| Australia | 24.9 | 22.9 | 21.9 | 24.3† | 11.6 | 11.2 | 7.3 | 7.3† |
| New Zealand | 17.0 | 16.7 | 20.8 | 24.0† | 7.9 | 8.3 | 7.8 | 8.6† |
| Hong Kong | 22.8 | 21.9 | 15.1 | 14.9 | 14.0 | 13.6 | 9.7 | 10.8 |
| Japan | 28.1 | 23.7 | 29.2 | 28.4 | 19.4 | 16.1 | 13.1 | 13.0 |
| Singapore | N/A | 20.8 | 14.5 | 16.3 | N/A | 12.8 | 10.1 | 12.0 |

* Adjusted on basis of age distribution of the U.S. total population, 1940.
† 1986 data.
‡ 1985 data.
N/A Not available.
Source of basic data: *1988 World Health Statistics Annual*, Table 10 and 12.
World Health Organization and various reports from the United States and Canada.

## Trend

In the United States, suicide rates have not significantly changed since the 1960s. As can be seen from Table 2, among men aged 15-74, the average death rate during 1960-64 was 21.4 per 100,000 and gradually rose to 24.3 per 100,000 in 1987. The trend among women was more favorable. Between 1960-64 and 1970-74 the mortality rate rose from 7.3 per 100,000 to 9.1 per 100,000 but thereafter declined--falling to 6.5 per 100,000 in 1987. The pattern for Canadian women was similar to that for women in the United States. For Canadian men, however, this was not the case. The age-adjusted death rate from suicide initially was lower than that for men in the United States (17.1 per 100,000 in 1960-64), but thereafter rapidly increased. It currently is 28 per 100,000.

In the United States, suicide rates have not significantly changed since the 1960s.

Over the years, the same nations tended to experience the highest and lowest suicide rates. For instance, from 1987 data back to 1970-74, Hungary reported the highest age-adjusted suicide death rate for both men and women aged 15-74. During 1960-64 the suicide rate in Hungary was only surpassed by the rate for women in Japan and the rate for men in Finland. Since the 1970s, among the countries reviewed, the second highest suicide rates occurred among men in Finland and women in Denmark. As a general rule, the death rates among men in Austria, Denmark, Switzerland and Czechoslovakia were also comparatively high as were the death rates among women in Belgium, Austria and Switzerland. On the more advantageous side, men and women in Northern Ireland, Ireland and Italy usually experienced the lowest death rates from suicide. Relatively low rates were also reported in England and Wales, Scotland, Portugal, the Netherlands and recently, for men, in Hong Kong and Singapore. Among women, in addition to the United States and Canadian experience, those residing in Norway, Australia and New Zealand recorded relatively favorable mortality rates.

Speculation abounds as to why mortality rates from suicide are consistently higher or lower in some countries than in others. Chronic use of alcohol and societal acceptability of suicide may be among the possible reasons. Certainly, politically suppressive societies could have an important negative effect on the suicide rate just as those with strong religious views could be a positive influence. In an effort to aid potential victims, and with the intention to avert the act, many countries have set up hot lines and prevention centers and instituted educational programs. Additionally, breaking the link between depression among parents and onset of anxiety in offspring may be fruitful in preventing future suicides. ☐

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# United States, Canada: Population Changes

During April 1990 the Bureau of the Census conducted the Bicentennial Census of the United States—the 21st in a series of decennial counts. When the tabulation is completed, it will reveal the official population figures for the nation and its various regions. One, however, may readily anticipate these findings because the major population components of the census—birth and death data—have been tracked assiduously by demographers throughout the decade. Intercensal migration estimates among the national regions and various states are less precise, though. Since the detailed census results will only begin to become available in the latter part of the year, MetLife's demographers have prepared current state population estimates to indicate the likely dimensions of the nation's geographic distribution by state around the census period. Table 1 presents these values as well as those for 1989, 1985 and the 1980 benchmark period for comparison purposes.

On January 1, 1990, there were an estimated 250,122,000 people (including armed forces overseas) in the United States. This represents a gain of over 2.5 million inhabitants during 1989 or a 1.0 percent increase. The annual relative rise for the country's population has not varied for most of the decade, although significant regional changes have occurred.

There were almost 4 million births last year—a level not reached since 1964.

## Natural Increase

Nationally, there were almost 4 million births last year—a level not reached since 1964. This compared with a provisional total of 3,913,000 in 1988 and a final count of 3,809,394 in 1987. The recent surge in the number of newborns has surprised some professionals because it was expected that many women born during the 1950s would remain childless. Apparently, a large number of women of childbearing ages were deferring producing offspring until their last biological minute.

During 1989 there were fewer deaths in the United States than in 1988. This marks the first time since 1982 that the number declined. According to the most recent available data, there were about 2,140,000 deaths last year or 30,000 less than the 2,171,000 reported in 1988 and just slightly more than the 2,123,323 in 1987. The crude death rate for 1989 is expected to be 8.7 per 1,000 population, compared with 8.8 per 1,000 in 1988. Also encouraging is the continued downward trend in the infant mortality rate. The number of newborns that died in the first year of life per 1,000 live births was 10.1 in 1987—the lowest final rate in U.S. history. Moreover, provisional data indicate that the rate declined below 10 per 1,000 live births in 1988 and was at this level in 1989.

The infant mortality rate was 10.1 in 1987—the lowest final rate in U.S. history.

## Regional Changes

Geographically, population growth in the United States fluctuated considerably. Generally, the states in the South and West expanded faster than those in the Northeast and Midwest, although recently the differences were not as pronounced. Compared with the average annual growth

# Table 1—Population of the United States by Geographic Area, 1980 to 1990

| | Numbers in Thousands | | | | Annual Percent Change | |
|---|---|---|---|---|---|---|
| | April 1 1980 | 1985 | January 1 1989 | 1990* | During 1989 | 1980 to 1990† |
| UNITED STATES | | | | | | |
| Including armed forces overseas | 227,061 | 238,207 | 247,617 | **250,122** | 1.0 | **1.0** |
| Excluding armed forces overseas | 226,546 | 237,677 | 247,098 | **249,613** | 1.0 | **1.0** |
| New England | 12,348 | 12,623 | 13,025 | **13,118** | .7 | **.6** |
| Maine | 1,125 | 1,160 | 1,214 | **1,233** | 1.6 | **.9** |
| New Hampshire | 921 | 988 | 1,099 | **1,122** | 2.1 | **2.0** |
| Vermont | 511 | 533 | 562 | **573** | 2.0 | **1.2** |
| Massachusetts | 5,737 | 5,811 | 5,909 | **5,933** | .4 | **.3** |
| Rhode Island | 947 | 964 | 997 | **1,003** | .6 | **.6** |
| Connecticut | 3,108 | 3,167 | 3,244 | **3,254** | .3 | **.5** |
| Middle Atlantic | 36,787 | 37,180 | 37,738 | **37,866** | .3 | **.3** |
| New York | 17,558 | 17,752 | 17,955 | **18,007** | .3 | **.3** |
| New Jersey | 7,365 | 7,545 | 7,749 | **7,768** | .2 | **.5** |
| Pennsylvania | 11,864 | 11,883 | 12,034 | **12,091** | .5 | **.2** |
| East North Central | 41,682 | 41,645 | 42,232 | **42,421** | .4 | **.2** |
| Ohio | 10,798 | 10,776 | 10,884 | **10,938** | .5 | **.1** |
| Indiana | 5,490 | 5,497 | 5,575 | **5,614** | .7 | **.2** |
| Illinois | 11,427 | 11,536 | 11,636 | **11,681** | .4 | **.2** |
| Michigan | 9,262 | 9,077 | 9,259 | **9,293** | .4 | **‡** |
| Wisconsin | 4,706 | 4,759 | 4,878 | **4,895** | .3 | **.4** |
| West North Central | 17,813 | 17,525 | 17,829 | **17,940** | .6 | **.4** |
| Minnesota | 4,076 | 4,178 | 4,338 | **4,388** | 1.2 | **.8** |
| Iowa | 2,914 | 2,882 | 2,841 | **2,850** | .3 | **-.2** |
| Missouri | 4,917 | 5,022 | 5,158 | **5,185** | .5 | **.5** |
| North Dakota | 653 | 686 | 665 | **658** | -1.1 | **.1** |
| South Dakota | 691 | 707 | 715 | **718** | .4 | **.4** |
| Nebraska | 1,570 | 1,605 | 1,607 | **1,616** | .6 | **.3** |
| Kansas | 2,364 | 2,445 | 2,505 | **2,525** | .8 | **.7** |
| South Atlantic | 36,959 | 39,890 | 42,800 | **43,527** | 1.7 | **1.7** |
| Delaware | 594 | 622 | 666 | **679** | 2.0 | **1.4** |
| Maryland | 4,217 | 4,371 | 4,669 | **4,743** | 1.6 | **1.2** |
| District of Columbia | 638 | 624 | 616 | **602** | -2.3 | **-.6** |
| Virginia | 5,347 | 5,671 | 6,066 | **6,154** | 1.5 | **1.5** |
| West Virginia | 1,950 | 1,945 | 1,867 | **1,849** | -1.0 | **-.5** |
| North Carolina | 5,882 | 6,214 | 6,531 | **6,619** | 1.3 | **1.2** |
| South Carolina | 3,122 | 3,317 | 3,494 | **3,538** | 1.3 | **1.3** |
| Georgia | 5,463 | 5,912 | 6,399 | **6,494** | 1.5 | **1.8** |
| Florida | 9,746 | 11,214 | 12,492 | **12,849** | 2.9 | **2.9** |
| East South Central | 14,666 | 15,087 | 15,386 | **15,454** | .4 | **.5** |
| Kentucky | 3,661 | 3,723 | 3,732 | **3,735** | .1 | **.2** |
| Tennessee | 4,591 | 4,749 | 4,917 | **4,965** | 1.0 | **.8** |
| Alabama | 3,894 | 4,008 | 4,116 | **4,132** | .4 | **.6** |
| Mississippi | 2,521 | 2,607 | 2,621 | **2,622** | ‡ | **.4** |
| West South Central | 23,747 | 26,378 | 26,911 | **27,003** | .3 | **1.3** |
| Arkansas | 2,286 | 2,354 | 2,399 | **2,413** | .6 | **.6** |
| Louisiana | 4,206 | 4,474 | 4,394 | **4,362** | -.7 | **.4** |
| Oklahoma | 3,025 | 3,315 | 3,236 | **3,218** | -.6 | **.6** |
| Texas | 14,229 | 16,235 | 16,882 | **17,010** | .8 | **1.8** |
| Mountain | 11,373 | 12,653 | 13,411 | **13,590** | 1.3 | **1.8** |
| Montana | 787 | 824 | 803 | **804** | .1 | **.2** |
| Idaho | 944 | 1,002 | 1,005 | **1,016** | 1.1 | **.8** |
| Wyoming | 470 | 511 | 474 | **469** | -1.1 | **‡** |
| Colorado | 2,890 | 3,211 | 3,308 | **3,320** | .4 | **1.4** |
| New Mexico | 1,303 | 1,438 | 1,514 | **1,535** | 1.4 | **1.7** |
| Arizona | 2,718 | 3,105 | 3,534 | **3,601** | 1.9 | **2.9** |
| Utah | 1,461 | 1,634 | 1,695 | **1,709** | .8 | **1.6** |
| Nevada | 800 | 928 | 1,078 | **1,136** | 5.4 | **3.7** |
| Pacific | 31,800 | 34,694 | 37,765 | **38,695** | 2.5 | **2.0** |
| Washington | 4,132 | 4,379 | 4,697 | **4,817** | 2.6 | **1.6** |
| Oregon | 2,633 | 2,685 | 2,789 | **2,848** | 2.0 | **.8** |
| California | 23,668 | 26,073 | 28,649 | **29,387** | 2.6 | **2.2** |
| Alaska | 402 | 514 | 524 | **526** | .4 | **2.8** |
| Hawaii | 965 | 1,043 | 1,106 | **1,119** | 1.2 | **1.5** |

* Estimated.

† Geometric average annual rate.

‡ Less than 0.05.

Note: Figures for divisions and states exclude population of the armed forces overseas.

Figures have been independently rounded; hence, the sum of parts may not equal the total.

Source: Computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on data from the Bureau of the Census and the National Center for Health Statistics.

States in the South and West expanded faster than those in the Northeast and Midwest.

rate for the past decade, during 1989 the only regional area that significantly exceeded the decennial gain was the West's Pacific division. As can be seen from Table 1, as a group, the population of the five states in this area rose by 2.5 percent last year—the 10-year average annual rate was 2.0 percent. Among the individual states, the number of persons in Oregon increased by 2.0 percent in 1989, compared with an average annual increase of 0.8 since 1980. The differences in relative gains were not as marked in Washington, but the recent growth was very substantial. For example, in contrast with a 10-year average population gain of 1.6 percent, the number of persons living in that state increased by 2.6 percent during 1989. This also happened to be the same percentage gain as in California. In our most populous state, the year ended with 29,387,000 residents living within its borders. The additional number of persons dwelling in California during 1989 accounted for 30 percent of the country's entire population growth.

In California—our most populous state—the year ended with 29,387,000 residents living within its borders.

In the Mountain states, there was an obvious growth slowdown during 1989. Of the states in this division, Arizona (hard-hit by a downturn in real estate) and Wyoming, Colorado and Utah (adversely impacted by energy production problems) experienced sharply curtailed population gains. On the other hand, in Nevada population increased by 5.4 percent—faster than in any other state and almost 50 percent greater than its decennial pace.

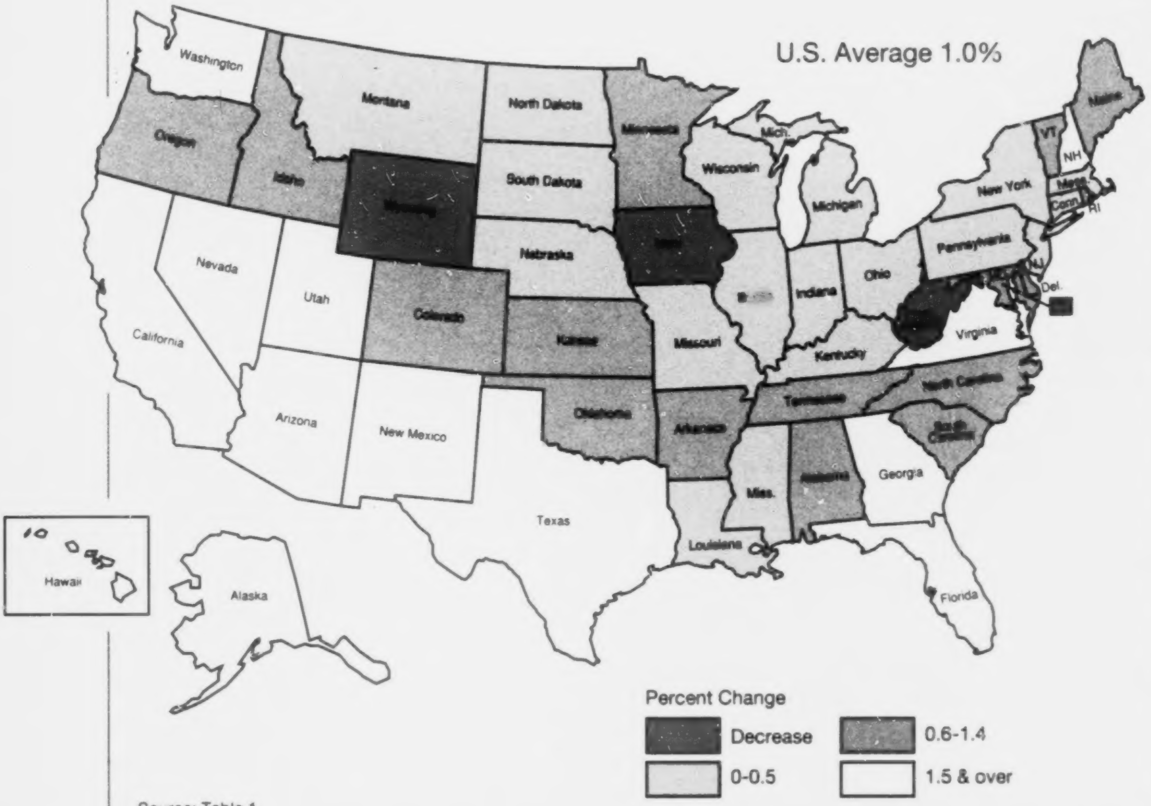
Nevada population increased by 5.4 percent—faster than in any other state.

The relative population changes for each state during the past decade are presented in Figure A.

## South

In the South, average or below average annual population gains were recorded last year. In the region's three geographic divisions only the South Atlantic still managed to maintain the relative growth pace of the 1980s. For the most part, this was accomplished by the sustained rapid population increases in Florida. The resident population in our fourth most populous state rose to 12,849,000 or by 2.9 percent during 1989. Of the eight other geographic areas in the division, only Delaware, Maryland and North Carolina experienced above average decennial growth. Slight differences in percentage increases occurred among the states of the East South Central division, but major slowdowns were experienced in the West South Central area. For example,

**Figure A —Percent Change in Resident Population by State United States, 1980-90**


U.S. Average 1.0%
Washington
Oregon
Idaho
Montana
Wyoming
North Dakota
South Dakota
Nebraska
Minnesota
Iowa
Wisconsin
Mich.
Michigan
Illinois
Indiana
Ohio
New York
Pennsylvania
Maine
VT
NH
Mass.
Conn.
RI
NJ
Del.
Virginia
Kentucky
Nevada
Utah
Colorado
Kansas
Missouri
California
Arizona
New Mexico
Oklahoma
Arkansas
Tennessee
North Carolina
South Carolina
Georgia
Alabama
Miss.
Louisiana
Texas
Florida
Alaska
Hawaii
Percent Change
Decrease
0.6-1.4
0-0.5
1.5 & over

Source: Table 1.

in Texas, third in terms of number of inhabitants, the population increased to 17,010,000 last year or only by 0.8 percent. This is in sharp contrast to the annual average gain of 1.8 percent over the decade. Also, population reversals occurred in Louisiana and Oklahoma. These three states are attempting to broaden their economic bases and de-emphasize the relative importance of the oil and gas industries. The District of Columbia and West Virginia were the only other areas in the South to experience a loss of residents last year.

## Table 2—Population of Canada by Province, 1980 to1990

| Province | Numbers in Thousands | | | | Annual Percent Change | |
|---|---|---|---|---|---|---|
| | January 1 1980 | June 3 1986 | January 1 1989 | 1990* | During 1989 | 1980 to 1990† |
| Canada | 23,912 | 25,353 | 26,094 | **26,420** | 1.2 | **1.0** |
| Newfoundland | 566 | 568 | 569 | **572** | .5 | **.1** |
| Prince Edward Island | 123 | 127 | 130 | **131** | .8 | **.6** |
| Nova Scotia | 844 | 873 | 885 | **890** | .6 | **.5** |
| New Brunswick | 694 | 710 | 716 | **722** | .8 | **.4** |
| Quebec | 6,360 | 6,540 | 6,668 | **6,726** | .9 | **.6** |
| Ontario | 8,540 | 9,113 | 9,514 | **9,652** | 1.5 | **1.2** |
| Manitoba | 1,023 | 1,071 | 1,083 | **1,085** | .2 | **.6** |
| Saskatchewan | 956 | 1,010 | 1,007 | **1,001** | -.6 | **.5** |
| Alberta | 2,106 | 2,375 | 2,415 | **2,454** | 1.6 | **1.5** |
| British Columbia | 2,636 | 2,889 | 3,029 | **3,107** | 2.6 | **1.7** |
| Yukon and Northwest Territories | 67 | 76 | 78 | **80** | 2.6 | **1.8** |

* Estimated.
† Geometric average annual rate.
Note: Figures have been independently rounded; hence, the sum of parts may not equal the total.
Source: Various reports by Statistics Canada.

Texas, Louisiana and Oklahoma are attempting to broaden their economic bases and de–emphasize the relative importance of the oil and gas industries.

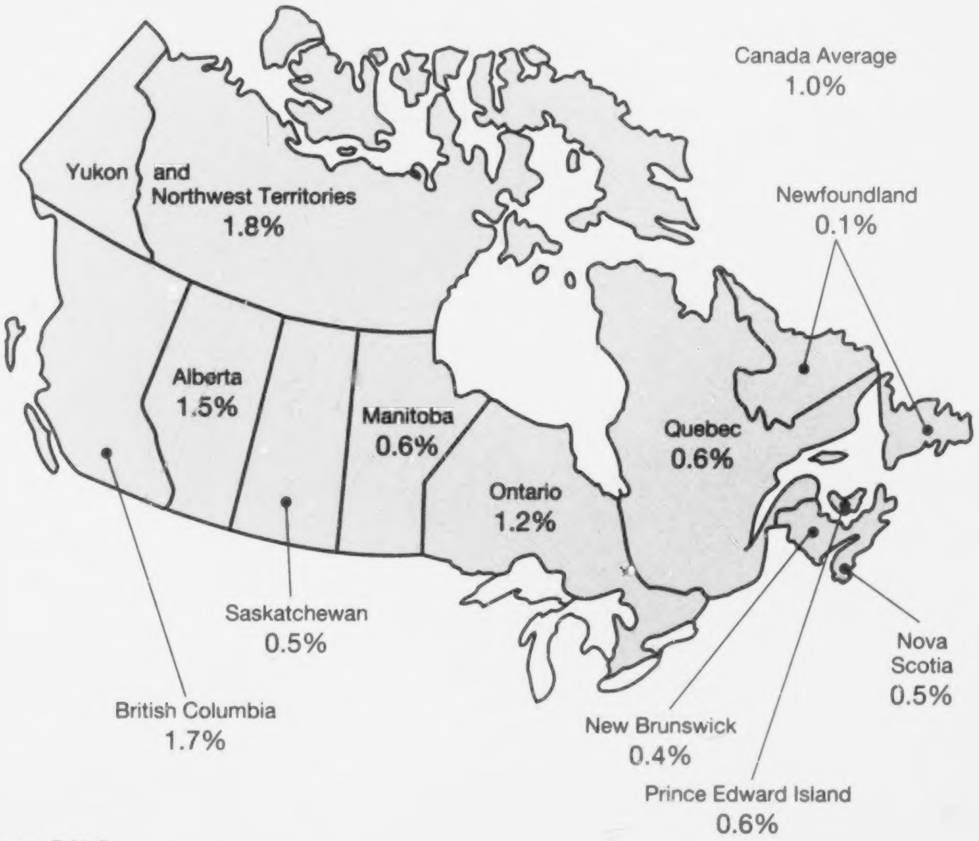
### Midwest

More encouraging were the results in the Midwest. This region is comprised of the states of the East North Central and West North Central divisions. Although the percentage gains in these areas were still well below the national average, for the most part last year's increases were a significant improvement over the changes during the ten-year period. In particular, Minnesota continues to stand out in the region. Between 1980 and 1990, its relative annual gain exceeded that of any other state in the area, as did last year's increment of 1.2 percent. Also worthy of mention was the continued population recovery of the heavily industrial states of Ohio, Indiana and Michigan.

## Northeast

Population growth in the Northeast continues to lag behind the national pace. However, in some of the less populated states the relative gain was twice the countrywide figure. During 1989, compared with the United States' average increase of 1.0 percent, the number of persons living in New Hampshire and Vermont grew by at least 2 percent, while in Maine the population rose by 1.6 percent. The enhanced relative population increases

**Figure B—Percent Change in Population by Province Canada, 1980-90**


Canada Average
1.0%
Yukon and Northwest Territories
1.8%
Newfoundland
0.1%
Alberta
1.5%
Manitoba
0.6%
Quebec
0.6%
Ontario
1.2%
Saskatchewan
0.5%
British Columbia
1.7%
Nova Scotia
0.5%
New Brunswick
0.4%
Prince Edward Island
0.6%

Source: Table 2.

in these states were fueled by the inflow of newcomers drawn by the expansion of recreational and hi-tech industries. Meanwhile, the percentage gains in the rest of the states of the New England and Middle Atlantic divisions were significantly below the national rate. Hardly any population gains were recorded in New Jersey and Connecticut, although some encouraging increases were noted in Pennsylvania and Massachusetts. In New York, an additional 50,000 residents were added to the state during the past year, bringing the total number of residents on January 1, 1990, to more than 18 million.

> The enhanced relative population increases in New Hampshire, Vermont and Maine were fueled by the inflow of newcomers drawn by the expansion of the recreational and hi-tech industries.

## Canadian Population Changes

As in the United States, the population in Canada continued to increase gradually—although at a slightly faster rate. According to recently released figures by Statistics Canada, there were 26,420,000 persons residing in that country on January 1, 1990. This represents an increase of 326,000 during the year and 1,067,000 since the June 3, 1986, census count (the next Canadian Census will take place in 1991). The population increment during 1989 equates to a 1.2 percentage gain and was exactly the same increase as in each of the two previous years.

Not surprisingly, the relative gains in the Canadian provinces varied significantly. As can be seen from Table 2, Ontario, Canada's most heavily populated province, grew by 1.5 percent during 1989, reaching 9,652,000 on January 1, 1990. More than two-fifths of Canada's total population increase occurred in this province. The population of Quebec, the second most inhabited province, totaled 6,726,000 at the beginning of this year, reflecting a gain of 58,000 persons or 0.9 percent. On the other hand, relative increases of 2.6 percent and 1.6 percent were recorded in British Columbia and Alberta—the third and fourth most populous areas. These two provinces also experienced the most rapid relative growth during the past decade (see Figure B). Between 1980 and 1990, the only other Canadian province to grow more rapidly than the nation's average annual increase of 1.0 percent was Ontario, where the gain was 1.2 percent. □

> Ontario, Canada's most heavily populated province, grew by 1.5 percent during 1989, reaching 9,652,000 on January 1, 1990.

# STATISTICAL INFORMATION, PLEASE

**Q** ***How many organ transplants are done annually in the United States and what are the most frequent procedures?***

**A** There were about 12,800 organ (excluding corneas) transplants in the United States in 1988, according to the United Network for Organ Sharing, which keeps a registry. This represents an increase of 8 percent over the 11,900 such procedures performed in 1987. Of the total organ transplants in 1988, there were 9,123 kidney operations; liver and heart were next, each accounting for over 1,600 procedures. In addition, 244 pancreas and 31 lung operations were done. Multiple organ transplants are less frequently performed. There were 74 heart-lung transplants in 1988.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

**Q** ***What are the leading causes of death for men and women aged 65 years and older in the United States?***

**A** The table that follows gives the ranking of the 10 leading causes of death at ages 65 and older for total persons, men and women.

### Mortality Among Persons Aged 65 and Over From the 10 Leading Causes by Sex United States, 1987

| | Total | | Men | | Women | |
|---|---|---|---|---|---|---|
| | **Number** | **Rate** | **Number** | **Rate** | **Number** | **Rate** |
| Diseases of heart | 618,989 (1) | 2,074.6 | 285,473 (1) | 2,355.6 | 333,516 (1) | 1,882.6 |
| Malignant neoplasms | 316,199 (2) | 1,059.8 | 169,314 (2) | 1,397.1 | 146,885 (2) | 829.1 |
| Cerebrovascular diseases | 129,784 (3) | 435.0 | 48,377 (3) | 399.2 | 81,407 (3) | 459.5 |
| Chronic obst. pulmonary diseases & allied conditions | 64,451 (4) | 216.0 | 39,085 (4) | 322.5 | 25,366 (5) | 143.2 |
| Pneumonia & influenza | 60,542 (5) | 202.9 | 28,061 (5) | 231.5 | 32,481 (4) | 183.3 |
| Diabetes mellitus | 28,377 (6) | 95.1 | 10,907 (7) | 90.0 | 17,470 (6) | 98.6 |
| Accidents & adverse effects | 25,838 (7) | 86.6 | 13,217 (6) | 109.1 | 12,621 (8) | 71.2 |
| Atherosclerosis | 21,372 (8) | 71.6 | 7,719 (9) | 63.7 | 13,653 (7) | 77.1 |
| Nephritis, nephrotic syndrome & nephrosis | 18,249 (9) | 61.2 | 8,688 (8) | 71.7 | 9,561 (9) | 54.0 |
| Septicemia | 15,868 (10) | 53.2 | 6,711 (10) | 55.4 | 9,157 (10) | 51.7 |

Note: Number in parenthesis denotes the ranking. Crude rate per 100,000 population.
Source: The National Center for Health Statistics. Rates for men and women computed by the Health and Safety Education Division of the Metropolitan Life Insurance Company, based on deaths from the National Center for Health Statistics, and population from the Bureau of the Census.

Please send your questions to:
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Health and Safety Education Division, Dept. SB
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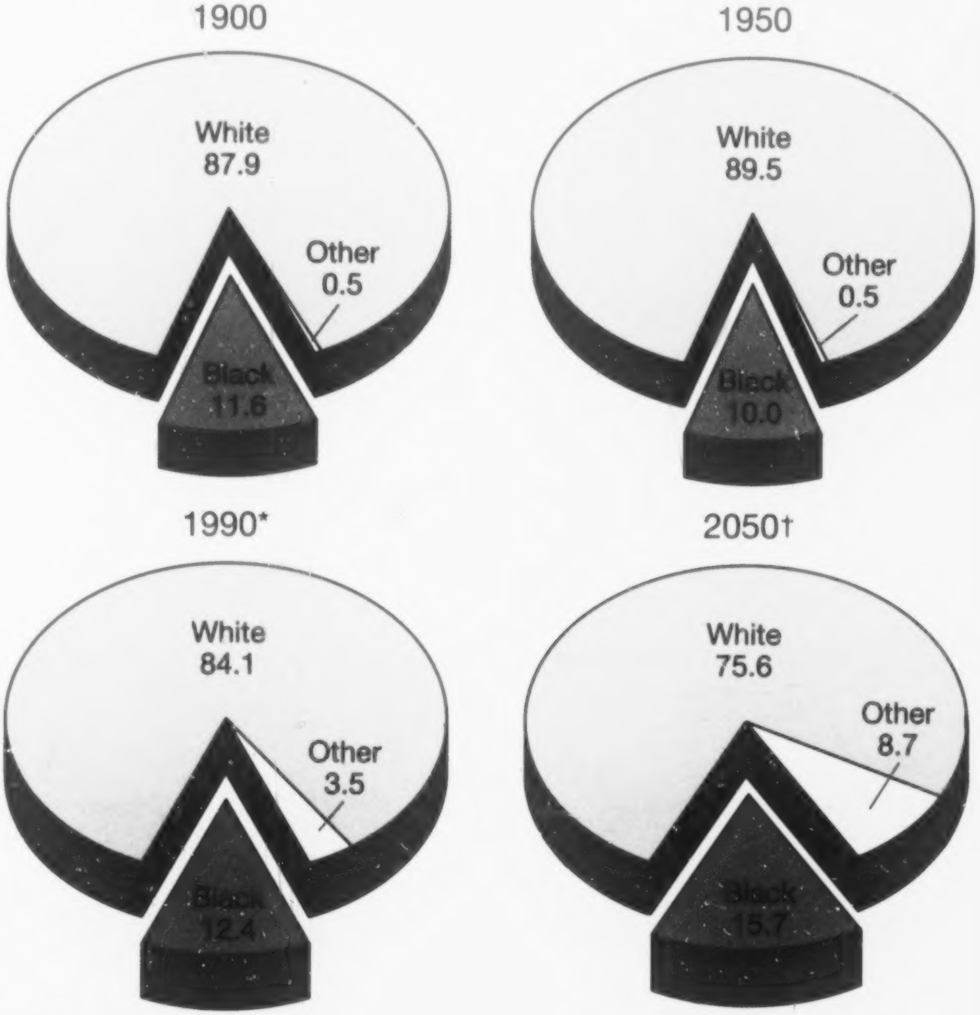
New York, N.Y. 10010-3690

# Historical Perspectives

United States Population by Ethnicity
1900, 1950, 1990 and 2050
Percent Distribution



*Estimated.
†Projected.
Source: United States Bureau of the Census.

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AND AFFILIATED COMPANIES

# SB

# STATISTICAL BULLETIN

Vol 71 No 3 Jul-Sep 1990

2 **Cardiac Catheterizations: Regional Variations in Average Hospital Charges.** Analysis of Metropolitan Life Insurance Company's recent claims experience reveals substantial geographic differences in cost. A sidebar, **The Context of Cardiac Catheterization,** discusses the patients admitted to the hospital under MetLife's managed care program.

11 **Major Improvements in Life Expectancy: 1989.** Longevity reached a record high for virtually every age, as shown in the new MetLife tables in this issue.

20 **Deaths From Chronic Obstructive Pulmonary Disease in the United States, 1987.** This study helps to explain why COPD continues to be the fifth leading cause of U.S. mortality.

27 **1990 Census Estimates.** A preview of the initial results of the 21st Decennial Census to be released later this year. Also outlined are regional population changes.

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# From the Editor's Desk

We may or may not achieve a world in which statistical analysis becomes as educationally important as the "Three R's," as George Bernard Shaw once urged, but regardless, it is essential that the fruits of statistics be readily available for all to see and understand.

## The Need for Reliable Information

From its onset in 1919, *SB* has strived to analyze data on questions important to the public in general, but primarily to certain specialists. In recent years, however, the need for information based on solid data analysis has reached virtually every walk of life. As evidence, since 1984 *SB* has worked to make itself a statistically reader-friendly publication without losing its basic commitment to reliable data analysis.

Whenever reading or analysis could be facilitated, "accessibility" has been our byword. We have used diverse text and data displays including figures, callouts, sidebars, commentaries, as well as the more traditional tables. Each was chosen to enhance rapid grasp of key facts. As always, we have provided as much data as seemed appropriate for complete comprehension--for instance, the voluminous life tables in the life expectancy articles, as shown in this issue.

In this ever-busier world, we know, however, that readers may have urgent needs for accessible, reliable information. We are pleased that *SB* is included among so many readers' key information resources. At *SB* we write and edit with those needs uppermost in our minds. We relish the challenge it represents.

## Statistical Data Needs are Widespread

*SB* has readers who are not primarily consumers of statistics, of course, but they do have statistically based information needs. They may mainly want clear presentation of statistical or social inferences with secondary emphasis on, for instance, detailed tabular data analyses.

With this issue, *SB* makes another subtle, but we believe important, editorial change to bring readers data analysis in a user-friendly format. A "Recap" box has been added at the onset of each article to highlight its major findings.

While it is an editorially challenging task to serve our diverse readership's information needs, we hope that you continue to find our efforts rewarding. Send us your response, won't you? Your suggestions and comments are always received warmly.

So, even if G.B. Shaw's hope is finally realized and a statistically educated world fully emerges, *SB* will remain trying to serve *all* its readers ably and energetically.

On that note of commitment, I wish you good reading. ☐

Charles B. Arnold

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*The Statistical Bulletin will publish comment and criticism from readers about its contents. Alternate interpretations of data analyses or different points of view about subjects are particularly welcome. Use address at end of publishers statement, opposite page.*

# Cardiac Catheterizations: Regional Variations in Average Hospital Charges

## *RECAP*

### *CARDIAC CATHETERIZATION CHARGES*

*The number of cardiac catheterizations performed in the United States increased from 299,000 in 1979 to over 900,000 in 1988. Analyses of Metropolitan Life Insurance Company claims experience for 2,788 in-hospital, diagnostic cardiac catheterizations during 1988 revealed an average total charge of $4,820 and a length of stay of 2.8 days. Substantial geographic variation in charges existed, with California reporting the highest average charge ($7,990) and Wisconsin the lowest ($3,210). As the technology, professional experience and patient outcomes improve, the proportion of uncomplicated cardiac catheterizations being performed on an outpatient basis is also increasing. This development should result in major decreases in some of the costs associated with the diagnosis of heart disease.*

The cardiac catheter represents a major clinical development of 20th century medical practice.[1] Cardiac catheterization is the process of examining the heart by inserting a thin tube into a vein or artery of the leg or arm and passing it to the heart. A liquid dye, visible by X-ray, can be injected through the catheter permitting its flow to be traced in an effort to identify the part of a coronary artery that is obstructed. Cardiac catheterization is also used to measure blood pressure, to measure the amount of oxygen in the blood, and to define both congenital and disease-associated heart defects.[1,2]

Cardiac catheterization was first performed on humans in 1929. A young surgeon threaded a urethral catheter into his heart through an exposed vein in his own arm, monitored its progress with a mirror and fluoroscope and documented the procedure with a chest X-ray.[3,4] Fifteen years elapsed before others were able to routinely and safely perform the procedure on patients.[5] Developmental modifications and safety improvements followed at the end of the 1940s with refinements in cardiac catheterization techniques continuing through the '50s and '60s. These advances provided the basis for the detection of congenital, valvular and coronary artery disease and the achievements were further "enhanced by the parallel development of corrective surgical techniques."[1]

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More than 900,000 cardiac catheterizations are performed each year in the United States.

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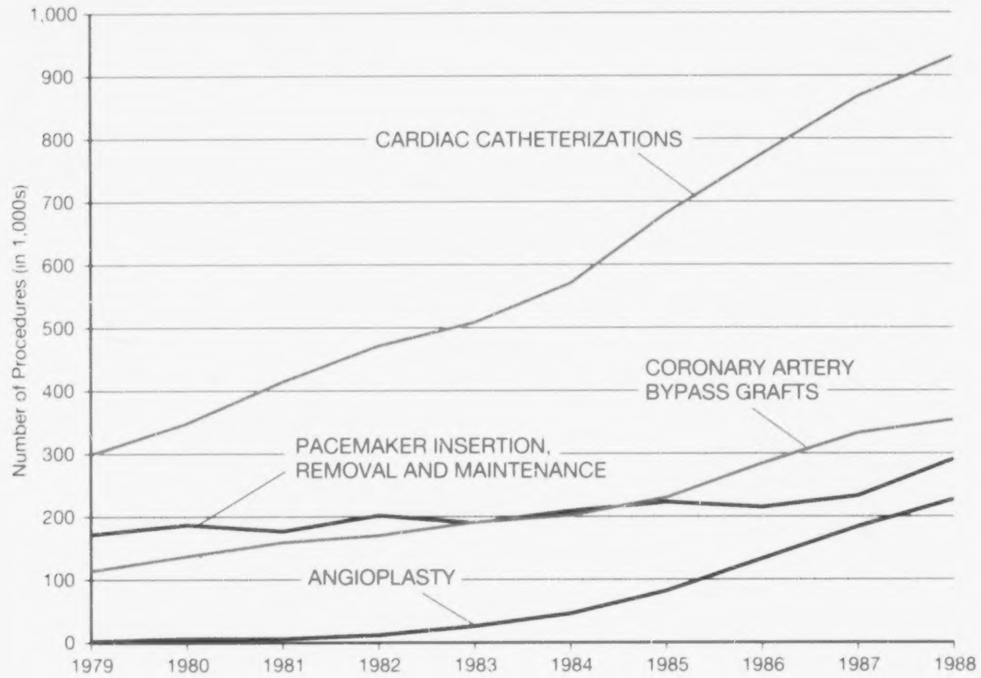
Percutaneous coronary angioplasty is a therapeutic catheterization technique introduced in the late '70s and its expanded

*David Johnson*

**Figure A—Estimated Number of Selected Inpatient Cardiovascular Operations and Procedures, United States, 1979-1988**



Source: American Heart Association and the National Center for Health Statistics, Hospital Discharge Survey data.

application and therapeutic value continue to be discovered.[5]

Today more than 900,000 cardiac catheterizations are performed annually in the United States.[6] Over the past 15 years, the procedure has evolved from a "primarily diagnostic discipline to one of major therapeutic significance."[5,7] The increasing popularity of balloon angioplasty underscores the therapeutic role that cardiac catheterization currently plays. Concomitant with the growing acceptance of cardiac catheterization has been the significant decrease in complications associated with the procedure. Arterial complications are reportedly down from more than 20 percent of study patients in the early 1970s, to less than 1 percent in the mid-1980s. This change has been ascribed to a variety of causes, including refined dissection techniques, greater surgical precision, routine heparinization and more appropriate site selection.[7] These and other improvements have led to markedly

Outpatient cardiac catheterizations are considered safe and feasible for certain select patients.

increased use of the technique throughout the world.[8]

Because of the proven efficacy and increased experience of physicians with the procedure, cardiac catheterizations are now also being performed on an outpatient basis for selected patients. Under specified conditions, patients can have a cardiac catheterization as an outpatient within the hospital setting or in freestanding clinics.[8-11] The consensus is that, within certain limits, "outpatient cardiac catheterization can be performed safely, with a potential reduction in costs and better utilization of medical beds."[10] In this era of increased health care cost containment strategies, such a change in setting for a highly utilized surgical procedure is obviously attractive and continues to gain supporters. In fact, data from Healthcare Knowledge Systems, Inc.,* indicate a 59 percent increase in the number of outpatient cardiac catheterizations (ICD-9-CM 37.21-37.23) performed in the United States between 1987 and 1988. The absolute numbers increased from 84,664 in 1987 to 134,378 in 1988 and the outpatient share also rose during this period—rising from 8.5 percent to 12.1 percent, respectively.[12] As these proportions increase, so will the monitoring and evaluation of the risks, benefits and outcomes associated with both in- and outpatient cardiac catheterizations.

The proportion of cardiac catheterizations performed on an outpatient basis increased from 8.5 percent in 1987 to 12.1 percent in 1988.

## Trends

Between 1979 and 1988, the estimated number of inpatient cardiac catheterizations tripled in the United States alone (Figure A). Just under 300,000 of these procedures were performed in U.S., non-federal, short-stay hospitals in 1979. By 1987 the number had increased to 866,000, and in 1988 there were an estimated 930,000.[6] While the number of these procedures is about 2.5 times higher than the number of coronary bypass surgeries performed annually, both procedures have experienced similar and major increases in rates of growth over the years. As evident in Figure A, the number of angioplasties has also increased but at an even more rapid pace, particularly since 1984. The relative safety of catheterization, coupled with its expanding therapeutic and diagnostic applications, undoubtedly will continue to contribute to increasing numbers of these procedures being performed in varying settings.

Between 1979 and 1988, the number of inpatient cardiac catheterizations tripled in the United States.

## The Metropolitan Study

The following presents average in-hospital charge data associated with claims paid during 1988 for uncomplicated, primarily diagnostic, cardiac catheterizations. The data are from claims made by employees and dependents of companies insured under Metropolitan Life Insurance Company group health insurance contracts. Corporate Health Strategies, Inc., a subsidiary of Metropolitan Life, linked the hospital and physicians' fees and length-of-stay data for cardiac catheterization claims. In an effort to determine the costs associated only with routine, in-hospital cardiac catheterizations, the study group was limited to those patients with only CPT-4* Code 93547, and a DRG** Code of 124 or 125

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* Formerly the Commission on Professional and Hospital Activities.

The study restrictions resulted in a sample totaling 2,788 patients—1,840 men and 948 women. The mean age of the men was 56.5 years; the women were slightly older, with a mean age of 57.7 years. Average ages ranged from 55.7 years in the South Atlantic and East South Central areas to 60.9 in the Mountain states. The male-to-female ratio varied from 3:1 in the New England region to 3:2 in the Mountain region. Average medical/surgical and hospital charges are presented by state and geographic area for men and women, combined, aged 18 to 87. Presentation of data is restricted to those 30 states in which 20 or more cardiac catheterizations were performed; these data represent 95 percent of the reported cases.

## Regional Variation in Charges

Substantial variation in average charges existed between geographic regions of the country (Figure B). According to the data in the accompanying table, average total charge for an uncomplicated inpatient cardiac catheterization was $4,820. The lowest total costs were in the South Atlantic states with charges 11 percent lower than the average for the United States. The highest total cost, by far, was the $7,630 charges reported in the Pacific area. This Pacific total was 58 percent *above* the national average, 49 percent above the region with the second highest average costs and 79 percent above the lowest regional costs. The West South Central area reported the second highest average charges with costs 6 percent higher than the U.S. total.

The highest average, total inpatient cost for a cardiac catheterization was in California with charges 66 percent above the U.S. average.

## State Variation in Charges

As seen in the accompanying table, average total charges for a cardiac catheterization differed by as much as 149 percent between states. The highest cost was reported in California (almost $8,000) and the lowest cost ($3,210) was reported in Wisconsin. The California charges were 66 percent *higher* than the U.S. norm, whereas the Wisconsin charges were 33 percent *lower*. States in which the average charges were between 10 percent and 25 percent above the national total were Illinois, Louisiana, Connecticut and Alabama. Charges 20 percent or more below the U.S. total were reported in Arkansas, Minnesota, South Carolina and Wisconsin.

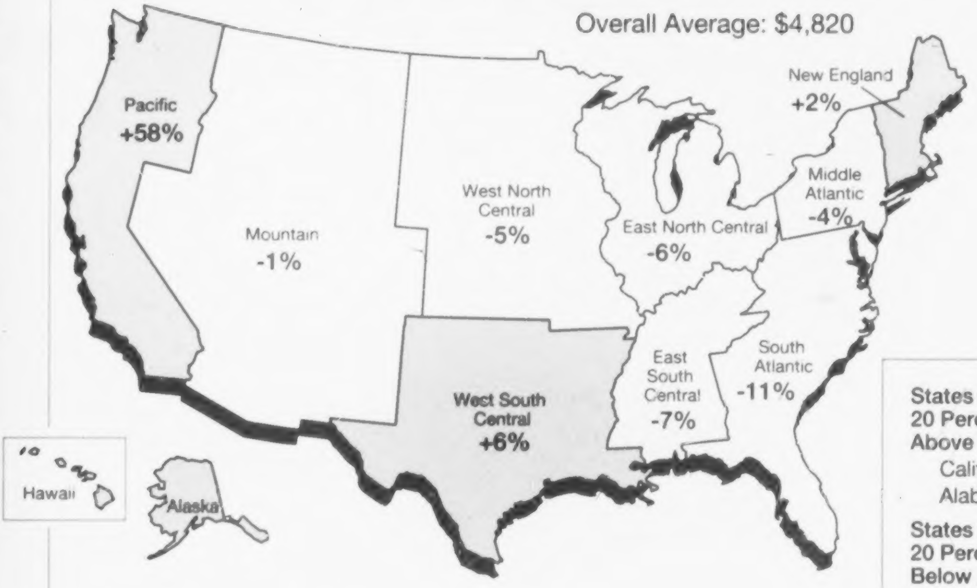
The lowest average total cost was reported in Wisconsin, where the charges were 33 percent below the average for the country.

---

* Combined left heart catheterization, selective coronary angiography, one or more coronary arteries, and selective left ventricular angiography. *Physicians' Current Procedural Terminology*: Fourth Edition.

**Circulatory disorders except AMI with cardiac catheterization. *Diagnosis Related Groups*.

**Figure B—Coronary Catheterization Charges* by Geographic Area Percent Difference From Overall Average, 1988**



Overall Average: $4,820

Source: See table.
*Charges from Metropolitan Life Group Health claims.

**States With Charges 20 Percent or More Above Average:**

| | |
|---|---|
| California | 66% |
| Alabama | 23% |

**States With Charges 20 Percent or More Below Average:**

| | |
|---|---|
| Wisconsin | 33% |
| South Carolina | 24% |
| Minnesota | 23% |
| Arkansas | 21% |

## Hospital Charges

On average, hospital charges for a cardiac catheterization, including room and board and ancillary fees, totaled $3,710. These charges accounted for 77 percent of the total health insurance costs for the procedure with differences noted by region and state. The proportions ranged from a high of 83 percent in Alabama to a low of 70 percent in New York and Maryland. Hospital charges were 10 percent or more above the average in California, Alabama, Louisiana, Connecticut, Illinois and Texas. In contrast, Wisconsin, South Carolina, Maryland, Arkansas and Minnesota reported hospital charges 20 percent or more *below* the nation's average.

Three-fourths of the hospital bill was for the provision of ancillary services, i.e. general and cardiac laboratory work, operating and recovery room fees, anesthesia, etc. These fees typically ran about two or four times higher than the room and board charges with wide between-state variation evident (see accompanying table). In Minnesota, for example, ancillary fees were 85 percent of the hospital total compared with 59 percent in Maryland. The highest ancillary fees were in California and Alabama with charges 60 percent and 47 percent, respectively, above the U.S. average. At the other end of the cost spectrum were Maryland, Wisconsin and New York with ancillary fees 41 percent, 31 percent and 30 percent, respectively, below the average.

A patient stayed in the hospital for a cardiac catheterization an average of 2.8 days. There were modest variations in

# Inpatient Coronary Catheterization Costs, 1988
# Metropolitan Life Insurance Company Group Health Claims

| | Average Costs ($) | | | | | | Percentage | |
|---|---|---|---|---|---|---|---|---|
| | Total Hospital & Physician | Hospital Charge | | | Physician Charge | Average Length of Stay | Hospital of Total | Ancillary of Hospital |
| Geographic Area | | Total | Room & Board | Ancillary | | | | |
| UNITED STATES | 4,820 | 3,710 | 940 | 2,770 | 1,110 | 2.8 | 77 | 75 |
| New England | 4,890 | 3,670 | 940 | 2,730 | 1,220 | 2.6 | 75 | 74 |
| New Hampshire | 4,460 | 3,340 | 790 | 2,550 | 1,120 | 2.4 | 75 | 76 |
| Connecticut | 5,540 | 4,330 | 1,010 | 3,320 | 1,210 | 2.7 | 78 | 77 |
| Middle Atlantic | 4,620 | 3,360 | 1,060 | 2,300 | 1,260 | 2.6 | 73 | 68 |
| New York | 4,570 | 3,190 | 1,240 | 1,950 | 1,380 | 2.6 | 70 | 61 |
| New Jersey | 4,940 | 3,540 | 1,000 | 2,540 | 1,400 | 2.6 | 72 | 72 |
| Pennsylvania | 4,430 | 3,320 | 1,020 | 2,300 | 1,110 | 2.7 | 75 | 69 |
| East North Central | 4,530 | 3,490 | 930 | 2,560 | 1,040 | 2.8 | 77 | 73 |
| Ohio | 4,100 | 3,130 | 790 | 2,340 | 970 | 2.6 | 76 | 75 |
| Indiana | 4,510 | 3,430 | 870 | 2,560 | 1,080 | 2.9 | 76 | 75 |
| Illinois | 5,420 | 4,240 | 1,250 | 2,990 | 1,180 | 3.2 | 78 | 71 |
| Wisconsin | 3,210 | 2,370 | 460 | 1,910 | 840 | 2.4 | 74 | 81 |
| West North Central | 4,600 | 3,620 | 1,060 | 2,560 | 980 | 2.9 | 79 | 71 |
| Minnesota | 3,700 | 2,870 | 430 | 2,440 | 830 | 1.6 | 78 | 85 |
| Iowa | 4,860 | 3,860 | 1,160 | 2,700 | 1,000 | 3.3 | 79 | 70 |
| Missouri | 4,940 | 3,910 | 1,370 | 2,540 | 1,030 | 3.5 | 79 | 65 |
| South Atlantic | 4,270 | 3,200 | 720 | 2,480 | 1,070 | 2.8 | 75 | 78 |
| Maryland | 3,920 | 2,760 | 1,130 | 1,630 | 1,160 | 3.9 | 70 | 59 |
| Virginia | 4,330 | 3,230 | 890 | 2,340 | 1,100 | 3.0 | 75 | 72 |
| West Virginia | 4,270 | 3,330 | 600 | 2,730 | 940 | 2.4 | 78 | 82 |
| North Carolina | 4,430 | 3,350 | 710 | 2,640 | 1,080 | 3.0 | 76 | 79 |
| South Carolina | 3,670 | 2,640 | 590 | 2,050 | 1,030 | 2.3 | 72 | 78 |
| Georgia | 4,330 | 3,250 | 720 | 2,530 | 1,080 | 2.9 | 75 | 78 |
| Florida | 4,410 | 3,330 | 710 | 2,620 | 1,080 | 2.4 | 76 | 79 |
| East South Central | 4,470 | 3,510 | 700 | 2,810 | 960 | 2.9 | 79 | 80 |
| Kentucky | 4,040 | 3,120 | 800 | 2,320 | 920 | 2.9 | 77 | 74 |
| Tennessee | 4,010 | 3,060 | 540 | 2,520 | 950 | 2.5 | 76 | 82 |
| Alabama | 5,930 | 4,930 | 850 | 4,080 | 1,000 | 3.4 | 83 | 83 |
| Mississippi | 4,040 | 3,020 | 510 | 2,510 | 1,020 | 3.1 | 75 | 83 |
| West South Central | 5,110 | 3,990 | 810 | 3,180 | 1,120 | 3.0 | 78 | 80 |
| Arkansas | 3,820 | 2,840 | 560 | 2,280 | 980 | 3.0 | 74 | 80 |
| Louisiana | 5,530 | 4,400 | 730 | 3,670 | 1,130 | 3.0 | 80 | 83 |
| Oklahoma | 4,730 | 3,760 | 920 | 2,840 | 970 | 2.5 | 79 | 76 |
| Texas | 5,260 | 4,090 | 840 | 3,250 | 1,170 | 3.0 | 78 | 79 |
| Mountain | 4,780 | 3,730 | 920 | 2,810 | 1,050 | 2.7 | 78 | 75 |
| Colorado | 4,700 | 3,690 | 770 | 2,920 | 1,010 | 2.3 | 79 | 79 |
| Utah | 4,140 | 3,390 | 840 | 2,550 | 750 | 2.5 | 82 | 75 |
| Pacific | 7,630 | 6,140 | 1,900 | 4,240 | 1,490 | 3.2 | 80 | 69 |
| California | 7,990 | 6,430 | 2,010 | 4,420 | 1,560 | 3.3 | 80 | 69 |

Note: Excludes states with fewer than 20 procedures.
Source: Claims data from Metropolitan Life Insurance Company merged and edited by Corporate Health Strategies, Inc.
Analyses and computations by Health and Safety Education Division, Metropolitan Life Insurance Company.

this length of confinement by region. Between-state variations were more pronounced, however, ranging from 3.9 days in Maryland to 1.6 days in Minnesota. As would be expected, the impact of number of days in the hospital is reflected in the average room and board fees.

## Physician Charges

The average total amount charged by medical and surgical doctors for a cardiac catheterization during 1988 was $1,110. This charge was 23 percent of the total bill and ranged from 30 percent in New York and Maryland to 17 percent in Alabama.

The states with the highest physician charges were California, New Jersey and New York, where the costs were more than 20 percent above the national average. These fees are in contrast to the lowest ones reported by physicians in Utah, Wisconsin and Minnesota, where the claims paid were more than 20 percent below those for the country as a whole.

As described above, regional variation in charges for a cardiac catheterization was fairly extensive for the cost categories examined. The reasons for these differences are usually attributed to factors such as the number of physicians in the area and their experience and medical and/or surgical training plus cost-of-living differences and the socioeconomic and demographic makeup of the region.

The development and refinement of cardiac catheterization have contributed to the understanding, measurement and documentation of the physiology, diagnosis and treatment of cardiovascular diseases.[1] As cardiac catheterization uses expand, as it is increasingly performed in freestanding as well as hospital-based outpatient clinics, as the population of stable patients having elective catheterizations increases, and as the procedure paves the way for development of less invasive techniques, the costs associated with the evaluation of heart disease will drop. Monitoring these costs in relation to outcomes and comparing them by patient characteristics and treatment settings will be of paramount importance to all dedicated to the delivery of high quality, cost-effective health care. ☐

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# The Context of Cardiac Catheterization

Between 1982 and 1987, the number of cardiac catheterizations in the United States nearly doubled in number from 471,000 to 866,000. That growth continued into 1988 when over 900,000 were performed.

The rise in the number of catheterizations is directly related to its diagnostic use for coronary artery bypass surgery and coronary balloon angioplasty, each of which was performed over 200,000 times in the United States during 1988. These procedures were subjects of two *SB* articles (Jan-Mar; and Jul-Sep, 1989).

There is, however, another side to the catheterization story: its impact on group health insurance charges. As numbers of diagnostic procedures burgeoned in recent years, so did their total charges. Third party health insurance payers felt the impact and in turn developed strategies to limit procedures to those absolutely medically necessary. The collective term applied to those strategies is "managed care."

## Inpatient Data in MetLife Study

In the preceding article, *SB* described regional utilization and charge data for this procedure *performed in the hospital* during 1988 for MetLife group health policyholders and their dependents. Most of these patients were actively employed persons for whom managed care was a principal feature of their benefit plans.

Perhaps 75 percent of all patients in this article were admitted to the hospital via managed care medical benefit plans that had incentives for *outpatient* cardiac catheterization, as well as provision for preadmission review, preadmission lab testing, same-day admission to hospital, and second surgical opinion, when inpatient services were used. The study by *SB* in this issue was based on inpatient data, despite the rapid growth in numbers of ambulatory catheterizations currently performed, about 12 percent of the total. This shift in setting is the result of the remarkable improvement in medical technology, training, and anesthesiology that has taken place in recent years.

## The Influence of Managed Care

Inpatient admissions under managed care--such as those studied in this article--require the attending physicians to document carefully these individuals' need for either more intensive care than the average, or show what features of their underlying medical condition necessitated special services, for instance, unstable high blood pressure or poorly controlled diabetes.

Generalizations from this article about catheterization charges and lengths of stay in the hospital need to be considered in the context of these characteristics. These patients were slightly sicker or had more complicated cases than those who would have their procedures done as outpatients. Interestingly, there are findings in the article that differ slightly from the findings of previous *SB* reports on regional variation in medical care charges and lengths of stay (LOS). For instance, data from California *did not* show the usual pattern of comparatively short LOS. While California's charges remained high, its LOS was exceeded by three other states. On the other hand, New York, which traditionally has LOS's substantially higher than California, reported shorter stays for catheterizations. In the absence of other information, however, *SB* thinks these findings probably result from managed care's influence on this procedure. □

# Major Improvements in Life Expectancy: 1989

## RECAP

### *IMPROVED U.S. LIFE EXPECTANCY*

*Longevity in 1989 rose to a record for virtually every age. According to MetLife, average remaining lifetime for newborns established a new high of 75.2 years. Expectation of life enhancements were attributed to the absence of major epidemics and the decline in total mortality. Recent longevity differences between males and females continued to narrow but disparities widened among whites and blacks.*

In the United States, 1989 was a banner year for expectation of life. According to the 1989 preliminary life tables, prepared by the Metropolitan Life Insurance Company, longevity significantly increased in virtually every age bracket between 1988 and 1989. For all newborns, average future lifetime in 1989 was a record 75.2 years or a rise of 0.3 years over the preliminary 1988 figure prepared by the National Center for Health Statistics.[1] This was the largest increment since 1982. The 1989 expectation of life at birth figure surpassed the previous peak of 75.0 years recorded in 1987 and breaks the stagnant pattern of minor longevity fluctuations that occurred in the past few years.[2,3]

Between 1988 and 1989 longevity increased significantly in virtually every age bracket. Average future lifetime in 1989 was a record 75.2 years.

## Mortality Decline

The substantial gain in expectation of life during 1989 was a reflection of last year's decline in total deaths. Although there were increases in mortality from AIDS, cancer and diabetes, these were offset by the absence of an influenza outbreak which affects the elderly, increasing total deaths usually from pneumonia and chronic obstructive pulmonary disease. Additionally, influenza epidemics have an adverse outcome on people of all ages with severe cardiovascular disease. Lacking any mitigating factors, age-adjusted mortality rates from cardiovascular disease--the country's leading cause of death--continued the steady decline initiated in 1968.

## Table 1—Expectation of Life (in Years) United States, 1979-81 to 1989

| Age | National Center for Health Statistics 1979-81 | 1986 | 1987 | 1988* | Metropolitan Life Insurance Company 1989† |
|---|---|---|---|---|---|
| Total Population | | | | | |
| 0 | 73.9 | 74.8 | 75.0 | 74.9 | 75.2 |
| 15 | 60.2 | 60.9 | 61.0 | 61.0 | 61.3 |
| 25 | 50.8 | 51.5 | 51.6 | 51.6 | 51.9 |
| 35 | 41.4 | 42.1 | 42.2 | 42.2 | 42.5 |
| 45 | 32.3 | 32.9 | 33.0 | 33.0 | 33.4 |
| 55 | 23.9 | 24.3 | 24.4 | 24.4 | 24.7 |
| 65 | 16.5 | 16.8 | 16.9 | 16.9 | 17.2 |
| 75 | 10.5 | 10.7 | 10.7 | 10.6 | 10.9 |
| 85 | 6.0 | 6.0 | 6.1 | 6.0 | 6.2 |
| Male | | | | | |
| 0 | 70.1 | 71.3 | 71.5 | 71.4 | 71.8 |
| 15 | 56.5 | 57.5 | 57.6 | 57.6 | 58.0 |
| 25 | 47.4 | 48.2 | 48.4 | 48.4 | 48.8 |
| 35 | 38.2 | 39.1 | 39.2 | 39.2 | 39.6 |
| 45 | 29.2 | 30.1 | 30.3 | 30.3 | 30.7 |
| 55 | 21.1 | 21.8 | 21.9 | 21.9 | 22.3 |
| 65 | 14.2 | 14.7 | 14.8 | 14.8 | 15.2 |
| 75 | 8.9 | 9.1 | 9.2 | 9.1 | 9.4 |
| 85 | 5.1 | 5.2 | 5.2 | 5.1 | 5.4 |
| Female | | | | | |
| 0 | 77.6 | 78.3 | 78.4 | 78.3 | 78.6 |
| 15 | 63.8 | 64.3 | 64.3 | 64.3 | 64.5 |
| 25 | 54.2 | 54.6 | 54.6 | 54.6 | 54.8 |
| 35 | 44.5 | 44.9 | 45.0 | 45.0 | 45.2 |
| 45 | 35.2 | 35.5 | 35.6 | 35.6 | 35.8 |
| 55 | 26.4 | 26.6 | 26.7 | 26.6 | 26.8 |
| 65 | 18.4 | 18.6 | 18.7 | 18.6 | 18.8 |
| 75 | 11.6 | 11.7 | 11.8 | 11.7 | 11.9 |
| 85 | 6.4 | 6.4 | 6.4 | 6.4 | 6.5 |

*Provisional †Estimated

Even more encouraging was the ongoing trend in infant mortality rates. 1989 marks the 27th consecutive year in which mortality rates in the first year of life declined. Provisional data indicate that infant mortality rates fell to an estimated record low of 9.7 per 1,000 live births. 1988 was the first year in which infant death rates fell below 10.0 per 1,000--specifically 9.9 per 1,000.

> 1989 marks the 27th consecutive year in which mortality rates in the first year of life declined.

### Gender Differences

Record high average remaining lifetime was established by baby boys and girls. Among newborn males, life expectancy increased to 71.8 years or by 0.4 years, while that for females rose to 78.6 years or a gain of 0.3 years. During 1989 the longevity advantage of newborn girls over boys was 6.8 years or 0.1 years less than the disparity in 1988 and 1987. This experience continues the recent trend in gradually diminished sex differences in expectation of life at birth.[4] A study by the Bureau of the Census disclosed some of the reasons for this narrowing of gender differences in mortality.[5] In essence, the tapering was attributed to less improvement in heart disease death rates among women as compared to the improvement among men.

Beyond infancy, life expectancy gains during 1989, as shown in Table 1, had new highs at each age level. For instance, men aged 25 could anticipate an additional 48.8 years of life or 0.4 years more than the value in 1988 and 1987. At age 45 the average remaining lifetime was 30.7 years in 1989 compared with 30.3 years in the two previous years. The enhancement at age 65 was also 0.4 years so that these men could look forward to another 15.2 years of life.

Among women, the magnitude of the longevity gains were slightly smaller. For the most part, at every age, average remaining lifetime during 1989 rose by 0.2 years from the preceding year. Further examination of the women's data reveals that between 1986 and 1988 women's longevity was at a virtual standstill. This all changed in 1989. At age 25, women could look forward to an additional 54.8 years of life. Life expectancy at age 45 rose to 35.8 years and women aged 65 could anticipate an additional 18.8 years of life.

Between 1986 and 1988 women's longevity was at a virtual standstill. This all changed in 1989

## Longevity Trend--By Race

Last year's results favorably compare with the impressive gains during the first half of the century. As may be seen in Table 2, between 1900-02 and 1949-51 expectation of life at birth for white boys rose from 48.2 to 66.3 years, while the comparable value for girls increased from 51.1 years to 72.0 years. These increases translated into average annual gains of about 0.4 years.

Last year's longevity increases favorably compare with the impressive gains during the first half of the century.

After mid-century more moderate increases in expectation of life were recorded. Thus, between 1949-51 and 1979-81, the average increase among white boys and girls amounted to roughly 0.2 years. It should be pointed out that among nonwhites, the increases during these periods were somewhat larger than for whites.

Since 1980, longevity gains among nonwhites outpaced those of whites. In the eight years since 1979-81, longevity at birth rose by 1.3 years for white boys or to 72.1 years, while that for white girls increased by 0.7 years or to 78.9 years. Among all nonwhites, the corresponding gains were 1.8 years and 1.5 years, respectively, but among blacks the gains were 1.0 years for boys and 0.9 years for girls. The previous rapid advances among blacks came to a halt in 1984.

Black Americans are experiencing substantial longevity disparities. In 1988 the provisional expectation of life at birth value for black infant boys was 65.1 years and represented a decrease of 0.5 years from the peak recorded in 1984. On the other hand, despite some fluctuations, the longevity record for black baby girls is encouraging. Average remaining lifetime for newborn black baby girls in 1988 was a record high 73.8 years, exceeding the value of 73.7 years recorded in 1982 and repeated in 1984.

Average remaining lifetime for newborn black baby girls in 1988 was a record high 73.8 years.

A review of the 1988 longevity data reveals that the disparity between newborn whites and blacks was 7.0 years among boys but only 5.1 years among girls. The recent divergent longevity picture between the race groups is in contrast to the historic trend. Between 1900-02 and 1979-81, expectation of life at birth for newborn black boys increased by 31.6 years while that for infant girls rose by 37.9 years. By comparison, the gains among whites amounted to 22.6 for boys and 27.1 years for girls. As a result, the longevity disparity in favor of white newborns decreased markedly.

The narrowing of the race disparities in longevity during most of this century is beginning to slacken.

The narrowing of the race disparities in men's longevity during most of this century is beginning to slacken. Continuing with the analysis of the data in Table 2, it can be ascertained that, with the exception of age 45, the longevity gap between whites and blacks widened. For example, at age 25 white male average future lifetime was 5.8 years greater than black males during 1979-81 and rose to 6.0 years in 1988. In this period, the difference at age 65 grew from 1.0 years to 1.3 years.

In contrast with men's experience, among females the narrowing of longevity differences was not as pronounced. This phenomenon only occurred among females aged 65 and 85. Thus, at age 65 the longevity advantage of white females increased from 1.5 years in 1979-81 to 1.6 years in 1988. On the other hand, at age 25 the longevity disparity diminished, falling to 4.2 years currently compared with 4.5 years at the beginning of the last decade.

## Latest Data

Despite the recent larger increases among men, women continue to have a significant longevity advantage. According to the final 1987 NCHS life tables (the latest year for which detailed values by race and sex are available) shown in Table 3, the sex differential among infants was 6.7 years for whites and 7.9 years for babies of all other races.[2] At age 25, white women could expect to outlive white men by 6.1 years, with the corresponding figure among nonwhites being 7.2 years. With advance in age, the longevity differential between the sexes diminished but was still considerable. For example, the disparity among whites was 5.3 years at age 45; was 3.9 years at age 65, and was still 1.2 years at age 85. Among persons of all other races, the longevity advantage of women was 5.5 years at age 45, 3.5 years at age 65, and 1.1 years at age 85.

In recent years mortality rates have been relatively stable. As shown in the right-hand section of Table 3, during 1987 mortality rates were less than one per 1,000 population at ages 1-36 among white women and at ages 1-25 among women of all other races. Death rates of this magnitude were only experienced for young males aged 1-15 among whites and at ages 2-15 for nonwhites. Death rates remained below five per 1,000 through age 48 for white men and through age 54 for white women. Among nonwhites, rates of this low level only prevailed through age 36 for men and through age 48 for women.

Based on mortality conditions as they existed in 1987, 859 out of every 1,000 white women could expect to celebrate their 65th birthday while only 751 out of

## Table 2—Expectation of Life at Selected Ages, by Race and Sex United States, 1900-02 to 1988

| | White | | | | | | All Other | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Total | | | | | | Black | | | | | |
| Age | 1900-02 | 1949-51 | 1979-81 | 1986 | 1987 | 1988* | 1900-02 | 1949-51 | 1979-81 | 1986 | 1987 | 1988* | 1900-02 | 1949-51 | 1979-81 | 1986 | 1987 | 1988* |
| **Expectation of Life (in Years)** | | | | | | | | | | | | | | | | | | |
| **Male** | | | | | | | | | | | | | | | | | | |
| 0 | 48.2 | 66.3 | 70.8 | 72.0 | 72.2 | 72.1 | | 58.9 | 65.6 | 67.2 | 67.3 | 67.4 | 32.5 | | 64.1 | 65.2 | 65.2 | 65.1 |
| 25 | 38.5 | 44.9 | 47.9 | 48.8 | 49.0 | 48.9 | | 39.5 | 43.5 | 44.7 | 44.8 | 45.0 | 32.2 | | 42.1 | 42.8 | 42.9 | 42.9 |
| 45 | 24.2 | 26.9 | 29.6 | 30.4 | 30.6 | 30.6 | N/A | 23.6 | 26.6 | 27.8 | 28.0 | 28.2 | 20.1 | N/A | 25.6 | 26.4 | 26.6 | 26.7 |
| 65 | 11.5 | 12.8 | 14.3 | 14.8 | 14.9 | 14.9 | | 12.8 | 13.8 | 14.1 | 14.3 | 14.5 | 10.4 | | 13.3 | 13.4 | 13.5 | 13.6 |
| 85 | 3.8 | 4.4 | 5.1 | 5.1 | 5.2 | 5.0 | | 5.4 | 5.7 | 5.7 | 5.8 | 5.8 | 4.0 | | 5.6 | 5.5 | 5.6 | 5.6 |
| **Female** | | | | | | | | | | | | | | | | | | |
| 0 | 51.1 | 72.0 | 78.2 | 78.8 | 78.9 | 78.9 | | 62.7 | 74.0 | 75.1 | 75.2 | 75.5 | 35.0 | | 72.9 | 73.5 | 73.6 | 73.8 |
| 25 | 40.1 | 49.8 | 54.6 | 55.0 | 55.1 | 55.0 | | 42.4 | 51.1 | 51.8 | 52.0 | 52.4 | 33.9 | | 50.1 | 50.5 | 50.5 | 50.8 |
| 45 | 25.5 | 31.1 | 35.5 | 35.8 | 35.9 | 35.8 | N/A | 26.1 | 32.8 | 33.4 | 33.5 | 33.9 | 21.4 | N/A | 31.9 | 32.2 | 32.3 | 32.6 |
| 65 | 12.2 | 15.0 | 18.6 | 18.7 | 18.8 | 18.7 | | 14.5 | 17.6 | 17.7 | 17.8 | 18.0 | 11.4 | | 17.1 | 17.0 | 17.1 | 17.1 |
| 85 | 4.1 | 4.8 | 6.3 | 6.4 | 6.4 | 6.3 | | 6.2 | 7.2 | 6.8 | 6.9 | 7.1 | 5.1 | | 7.1 | 6.7 | 6.8 | 6.8 |
| **Chances per 1,000 of Surviving From Birth to Specific Age** | | | | | | | | | | | | | | | | | | |
| **Male** | | | | | | | | | | | | | | | | | | |
| 25 | 739 | 943 | 966 | 971 | 972 | 971 | | 903 | 952 | 958 | 958 | 957 | 533 | | 948 | 954 | 953 | 952 |
| 45 | 614 | 890 | 925 | 931 | 932 | 931 | N/A | 787 | 866 | 876 | 874 | 873 | 392 | N/A | 850 | 856 | 852 | 850 |
| 65 | 392 | 635 | 724 | 748 | 751 | 750 | | 452 | 585 | 625 | 629 | 631 | 190 | | 551 | 581 | 584 | 584 |
| 85 | 53 | 120 | 185 | 206 | 212 | 212 | | 99 | 145 | 158 | 161 | 167 | 20 | | 124 | 128 | 129 | 131 |
| **Female** | | | | | | | | | | | | | | | | | | |
| 25 | 766 | 961 | 981 | 984 | 984 | 984 | | 923 | 970 | 975 | 975 | 973 | 558 | | 968 | 972 | 972 | 970 |
| 45 | 647 | 927 | 961 | 966 | 966 | 966 | N/A | 823 | 930 | 938 | 938 | 938 | 423 | N/A | 923 | 929 | 929 | 928 |
| 65 | 438 | 768 | 848 | 857 | 859 | 858 | | 524 | 754 | 777 | 779 | 787 | 220 | | 733 | 749 | 751 | 758 |
| 85 | 71 | 213 | 388 | 402 | 405 | 402 | | 156 | 305 | 322 | 324 | 336 | 36 | | 280 | 283 | 283 | 291 |

* Provisional.
Source: Various reports by the National Center for Health Statistics.

# Table 3—Expectation of Life and Mortality Rates at Single Years of Age by Race and Sex, United States, 1987

| | Expectation of Life (in Years) | | | | | Mortality Rate per 1,000 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | White | | All Other | | Total | White | | All Other | |
| Age | Persons | Male | Female | Male | Female | Persons | Male | Female | Male | Female |
| 0 | 75.0 | 72.2 | 78.9 | 67.3 | 75.2 | 10.1 | 9.6 | 7.6 | 17.0 | 14.0 |
| 1 | 74.7 | 71.9 | 78.5 | 67.4 | 75.3 | .7 | .7 | .6 | 1.1 | .8 |
| 2 | 73.8 | 71.0 | 77.6 | 66.5 | 74.3 | .5 | .5 | .4 | .8 | .7 |
| 3 | 72.8 | 70.0 | 76.6 | 65.6 | 73.4 | .4 | .4 | .3 | .7 | .6 |
| 4 | 71.9 | 69.0 | 75.6 | 64.6 | 72.4 | .4 | .4 | .3 | .6 | .4 |
| 5 | 70.9 | 68.1 | 74.7 | 63.6 | 71.4 | .3 | .3 | .2 | .5 | .4 |
| 6 | 69.9 | 67.1 | 73.7 | 62.7 | 70.5 | .3 | .3 | .2 | .4 | .3 |
| 7 | 68.9 | 66.1 | 72.7 | 61.7 | 69.5 | .2 | .3 | .2 | .4 | .3 |
| 8 | 67.9 | 65.1 | 71.7 | 60.7 | 68.5 | .2 | .3 | .2 | .3 | .2 |
| 9 | 66.9 | 64.1 | 70.7 | 59.7 | 67.5 | .2 | .2 | .1 | .3 | .2 |
| 10 | 66.0 | 63.1 | 69.7 | 58.8 | 66.5 | .2 | .2 | .1 | .3 | .2 |
| 11 | 65.0 | 62.2 | 68.7 | 57.8 | 65.5 | .2 | .2 | .1 | .3 | .2 |
| 12 | 64.0 | 61.2 | 67.7 | 56.8 | 64.6 | .2 | .3 | .2 | .4 | .2 |
| 13 | 63.0 | 60.2 | 66.8 | 55.8 | 63.6 | .3 | .4 | .2 | .5 | .2 |
| 14 | 62.0 | 59.2 | 65.8 | 54.8 | 62.6 | .5 | .6 | .3 | .7 | .3 |
| 15 | 61.0 | 58.2 | 64.8 | 53.9 | 61.6 | .6 | .8 | .4 | .9 | .3 |
| 16 | 60.1 | 57.3 | 63.8 | 52.9 | 60.6 | .8 | 1.0 | .5 | 1.1 | .4 |
| 17 | 59.1 | 56.4 | 62.8 | 52.0 | 59.6 | .9 | 1.2 | .5 | 1.3 | .5 |
| 18 | 58.2 | 55.4 | 61.9 | 51.0 | 58.7 | 1.0 | 1.3 | .5 | 1.6 | .5 |
| 19 | 57.2 | 54.5 | 60.9 | 50.1 | 57.7 | 1.0 | 1.4 | .5 | 1.8 | .6 |
| 20 | 56.3 | 53.6 | 59.9 | 49.2 | 56.7 | 1.1 | 1.5 | .5 | 2.1 | .7 |
| 21 | 55.3 | 52.6 | 59.0 | 48.3 | 55.8 | 1.1 | 1.6 | .5 | 2.3 | .8 |
| 22 | 54.4 | 51.7 | 58.0 | 47.4 | 54.8 | 1.2 | 1.6 | .5 | 2.5 | .8 |
| 23 | 53.5 | 50.8 | 57.0 | 46.5 | 53.9 | 1.2 | 1.6 | .5 | 2.6 | .9 |
| 24 | 52.5 | 49.9 | 56.1 | 45.7 | 52.9 | 1.2 | 1.6 | .5 | 2.7 | .9 |
| 25 | 51.6 | 49.0 | 55.1 | 44.8 | 52.0 | 1.2 | 1.6 | .5 | 2.7 | .9 |
| 26 | 50.7 | 48.0 | 54.1 | 43.9 | 51.0 | 1.2 | 1.5 | .6 | 2.7 | 1.0 |
| 27 | 49.7 | 47.1 | 53.1 | 43.0 | 50.0 | 1.2 | 1.5 | .6 | 2.8 | 1.0 |
| 28 | 48.8 | 46.2 | 52.2 | 42.1 | 49.1 | 1.2 | 1.6 | .6 | 3.0 | 1.1 |
| 29 | 47.8 | 45.3 | 51.2 | 41.3 | 48.2 | 1.3 | 1.6 | .6 | 3.2 | 1.2 |
| 30 | 46.9 | 44.3 | 50.2 | 40.4 | 47.2 | 1.3 | 1.7 | .6 | 3.4 | 1.3 |
| 31 | 46.0 | 43.4 | 49.3 | 39.5 | 46.3 | 1.4 | 1.7 | .7 | 3.6 | 1.5 |
| 32 | 45.0 | 42.5 | 48.3 | 38.7 | 45.3 | 1.5 | 1.8 | .7 | 3.8 | 1.6 |
| 33 | 44.1 | 41.6 | 47.3 | 37.8 | 44.4 | 1.5 | 1.9 | .7 | 4.0 | 1.7 |
| 34 | 43.1 | 40.6 | 46.4 | 37.0 | 43.5 | 1.6 | 1.9 | .8 | 4.3 | 1.8 |
| 35 | 42.2 | 39.7 | 45.4 | 36.1 | 42.6 | 1.7 | 2.0 | .8 | 4.6 | 1.9 |
| 36 | 41.3 | 38.8 | 44.4 | 35.3 | 41.6 | 1.8 | 2.1 | .9 | 4.9 | 2.0 |
| 37 | 40.4 | 37.9 | 43.5 | 34.5 | 40.7 | 1.9 | 2.2 | 1.0 | 5.2 | 2.1 |
| 38 | 39.4 | 37.0 | 42.5 | 33.6 | 39.8 | 2.0 | 2.3 | 1.0 | 5.5 | 2.2 |
| 39 | 38.5 | 36.0 | 41.6 | 32.8 | 38.9 | 2.1 | 2.4 | 1.1 | 5.7 | 2.4 |
| 40 | 37.6 | 35.1 | 40.6 | 32.0 | 38.0 | 2.2 | 2.5 | 1.2 | 5.9 | 2.6 |
| 41 | 36.7 | 34.2 | 39.7 | 31.2 | 37.1 | 2.3 | 2.7 | 1.3 | 6.2 | 2.8 |
| 42 | 35.8 | 33.3 | 38.7 | 30.4 | 36.2 | 2.4 | 2.8 | 1.4 | 6.4 | 3.0 |
| 43 | 34.8 | 32.4 | 37.8 | 29.6 | 35.3 | 2.6 | 3.1 | 1.6 | 6.8 | 3.2 |
| 44 | 33.9 | 31.5 | 36.8 | 28.8 | 34.4 | 2.9 | 3.3 | 1.8 | 7.1 | 3.5 |
| 45 | 33.0 | 30.6 | 35.9 | 28.0 | 33.5 | 3.2 | 3.6 | 2.0 | 7.5 | 3.7 |
| 46 | 32.1 | 29.7 | 35.0 | 27.2 | 32.6 | 3.5 | 4.0 | 2.2 | 7.9 | 4.0 |
| 47 | 31.2 | 28.8 | 34.0 | 26.4 | 31.8 | 3.8 | 4.4 | 2.5 | 8.5 | 4.3 |
| 48 | 30.4 | 27.9 | 33.1 | 25.6 | 30.9 | 4.2 | 4.8 | 2.7 | 9.2 | 4.8 |
| 49 | 29.5 | 27.1 | 32.2 | 24.9 | 30.1 | 4.6 | 5.4 | 3.0 | 10.0 | 5.3 |
| 50 | 28.6 | 26.2 | 31.3 | 24.1 | 29.2 | 5.1 | 6.0 | 3.4 | 11.0 | 5.8 |
| 51 | 27.8 | 25.4 | 30.4 | 23.4 | 28.4 | 5.7 | 6.6 | 3.7 | 12.0 | 6.4 |
| 52 | 26.9 | 24.5 | 29.5 | 22.6 | 27.6 | 6.2 | 7.3 | 4.1 | 12.9 | 7.0 |
| 53 | 26.1 | 23.7 | 28.6 | 21.9 | 26.7 | 6.8 | 8.1 | 4.5 | 13.7 | 7.5 |
| 54 | 25.3 | 22.9 | 27.8 | 21.2 | 25.9 | 7.4 | 9.0 | 4.9 | 14.5 | 8.0 |
| 55 | 24.4 | 22.1 | 26.9 | 20.5 | 25.2 | 8.0 | 9.8 | 5.3 | 15.3 | 8.5 |
| 56 | 23.6 | 21.3 | 26.0 | 19.8 | 24.4 | 8.7 | 10.7 | 5.8 | 16.2 | 9.0 |
| 57 | 22.8 | 20.5 | 25.2 | 19.2 | 23.6 | 9.5 | 11.8 | 6.4 | 17.4 | 9.8 |
| 58 | 22.1 | 19.8 | 24.3 | 18.5 | 22.8 | 10.5 | 13.1 | 7.1 | 18.8 | 10.7 |
| 59 | 21.3 | 19.0 | 23.5 | 17.8 | 22.1 | 11.6 | 14.4 | 7.8 | 20.5 | 11.9 |
| 60 | 20.5 | 18.3 | 22.7 | 17.2 | 21.3 | 12.7 | 16.0 | 8.6 | 22.4 | 13.2 |
| 61 | 19.8 | 17.6 | 21.9 | 16.6 | 20.6 | 14.0 | 17.6 | 9.5 | 24.4 | 14.5 |
| 62 | 19.1 | 16.9 | 21.1 | 16.0 | 19.9 | 15.2 | 19.2 | 10.4 | 26.3 | 15.7 |
| 63 | 18.3 | 16.2 | 20.3 | 15.4 | 19.2 | 16.4 | 20.7 | 11.3 | 28.0 | 16.7 |
| 64 | 17.6 | 15.6 | 19.5 | 14.8 | 18.5 | 17.6 | 22.2 | 12.3 | 29.7 | 17.6 |
| 65 | 16.9 | 14.9 | 18.8 | 14.3 | 17.8 | 18.8 | 23.8 | 13.3 | 31.3 | 18.6 |
| 66 | 16.3 | 14.3 | 18.0 | 13.7 | 17.2 | 20.2 | 25.5 | 14.4 | 33.2 | 19.6 |
| 67 | 15.6 | 13.6 | 17.3 | 13.2 | 16.5 | 21.8 | 27.7 | 15.7 | 35.3 | 20.9 |
| 68 | 14.9 | 13.0 | 16.5 | 12.6 | 15.8 | 23.8 | 30.3 | 17.1 | 37.8 | 22.6 |
| 69 | 14.3 | 12.4 | 15.8 | 12.1 | 15.2 | 26.0 | 33.5 | 18.8 | 40.6 | 24.6 |
| 70 | 13.6 | 11.8 | 15.1 | 11.6 | 14.6 | 28.5 | 36.9 | 20.6 | 43.7 | 26.8 |
| 71 | 13.0 | 11.2 | 14.4 | 11.1 | 13.9 | 31.1 | 40.6 | 22.6 | 47.0 | 29.1 |
| 72 | 12.4 | 10.7 | 13.7 | 10.6 | 13.3 | 33.8 | 44.4 | 24.7 | 50.0 | 31.4 |
| 73 | 11.9 | 10.2 | 13.1 | 10.2 | 12.8 | 36.6 | 48.3 | 27.0 | 53.6 | 33.4 |
| 74 | 11.3 | 9.6 | 12.4 | 9.7 | 12.2 | 39.6 | 52.4 | 29.5 | 56.8 | 35.4 |
| 75 | 10.7 | 9.1 | 11.8 | 9.3 | 11.6 | 42.8 | 56.7 | 32.3 | 60.0 | 37.6 |
| 76 | 10.2 | 8.7 | 11.2 | 8.8 | 11.1 | 46.3 | 61.5 | 35.4 | 63.9 | 40.1 |
| 77 | 9.7 | 8.2 | 10.6 | 8.4 | 10.5 | 50.2 | 66.7 | 38.9 | 68.3 | 43.3 |
| 78 | 9.1 | 7.8 | 10.0 | 8.0 | 10.0 | 54.7 | 72.6 | 42.9 | 73.5 | 47.2 |
| 79 | 8.6 | 7.3 | 9.4 | 7.6 | 9.4 | 59.6 | 79.1 | 47.4 | 79.6 | 52.0 |
| 80 | 8.2 | 6.9 | 8.8 | 7.2 | 8.9 | 65.3 | 86.2 | 52.5 | 86.8 | 57.7 |
| 81 | 7.7 | 6.5 | 8.3 | 6.9 | 8.4 | 71.6 | 94.1 | 58.4 | 95.1 | 64.6 |
| 82 | 7.2 | 6.1 | 7.8 | 6.5 | 8.0 | 78.9 | 102.6 | 65.3 | 104.9 | 72.7 |
| 83 | 6.8 | 5.8 | 7.3 | 6.2 | 7.6 | 87.1 | 111.8 | 73.3 | 116.3 | 82.3 |
| 84 | 6.4 | 5.5 | 6.8 | 6.0 | 7.2 | 96.5 | 121.4 | 83.0 | 129.8 | 93.8 |
| 85 | 6.1 | 5.2 | 6.4 | 5.8 | 6.9 | | | | | |

Source: National Center for Health Statistics. *Vital Statistics of the United States, 1987;* Vol. II, Sec. 6, Life Tables, DHHS Publication No. (PHS) 90-1104.

every 1,000 white men were likely to do so. Among nonwhites, the chances of surviving until age 65 were 779 out of 1,000 for women and 629 in 1,000 for men. The likelihood of a person celebrating an 85th birthday was 405 in 1,000 among white women and 324 in 1,000 for nonwhite women. Among men, the chances of reaching age 85 were around half those of women.

Among men, the chances of reaching age 85 were around half those of women.

## Outlook

The longevity enhancements during 1989 hopefully indicate that additional gains will be forthcoming. In fact, the latest released projection report by the Bureau of the Census forecasts, using a conservative approach, that by the year 2000 expectation of life at birth may rise to 73.5 years for males and 80.4 years for females. For both sexes combined, longevity could reach 77.0 years by the turn of the century. There are even projections exceeding 81.0 years by 2080.[6] Notwithstanding, at least one ominous cloud is on the horizon: mortality from AIDS is expected to increase significantly from present levels. The impact of this disease may adversely affect life table expectancy, especially those of males, because of a consequent reduction of the number of cumulative person-years in the life table analysis. □

## References

[1] National Center for Health Statistics, *Monthly Vital Statistics Report*, Vol. 37, No. 13. DHHS Pub. No. (PHS) 89-1120. Hyattsville, Md. July 26, 1989.

[2] National Center for Health Statistics: *Vital Statistics of the United States, 1987*, Vol. II, Sec. 6, Life Tables. DHHS Pub. No. (PHS) 90-1104. Hyattsville, Md. Feb. 1990.

[3] "Life expectancy remains at record level." *Statistical Bulletin*. 70(3):26-30, Jul-Sep 1989.

[4] "New high for expectation of life." *Statistical Bulletin*. 68(3):8-14, Jul-Sep 1987.

[5] U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1045. "United States Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1980 to 1988." Washington, D.C. Jan. 1990.

[6] U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1018. "Projections of the Population of the United States, by Age, Sex, and Race: 1988 to 2080." Washington, D.C. Jan. 1989.

# Capsule Briefs

are timely selections
with broad reader interest

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## Asbestos Removal

Today's Quiz: Generally speaking, how great a health hazard is asbestos when it is present in school walls and ceilings? The current scientific consensus is that for well-repaired, painted school room walls, the estimated annual U.S. deaths attributable to asbestos range from 0.005 to 0.093 *per million exposed students.* Practically speaking then, the correct answer is "zero." (Mossman, B.T., Bignon, J., *et al*, Science, 1990, 247:294-301)....Since 95 percent of asbestos used in the U.S. is the harmless chrysotile form, most exposures do not involve health risk. The annual public expense of asbestos abatement is staggering, however. For 1990 it has been estimated at $7.0 billion, an increase during 1989 of over 30 percent. (Abelson, P.H., **Science**, 1990, 247:1017.) □

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## Families Find Hope at Mt. Hope

How do healthy families get that way? Recent studies have begun to unravel the process. Mt. Hope Family Center, University of Rochester, only four years old, is already recognized internationally for its creative research in this previously poorly understood but critical part of life. The Center's studies involve day care for three-to-five-year-olds, child and parent therapy, parent training, diagnostic testing, a summer camp for six-to-ten-year-olds, an after-school program for elementary-aged children, community consultation services and graduate level training. Most of the families studied are dysfunctional, in poverty, and have children often exposed to violence. Based on their work, one hopes, however, that new social directions will emerge for all families. (DeAngelis, T., **The Monitor, American Psychological Association**, 1990, 21:1,9-10.) □

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## "Elderly Primigravidas" of the World: Rejoice!

What every first-time, pregnant woman past 35 knows: anyone calling her an "elderly primigravida" risks a punch in the kisser. This term originated 40 years ago to denote the assumed increased risk to mother and fetus when maternal age exceeded 35. Undaunted, a New York City investigative team (which included two women) recently studied maternal and fetal risk in 3,917 pregnant women, including 799 aged 35 and older. The latter had outcome results which were, except for postpartum complications, statistically the same as the women younger than age 35. In a companion editorial, the study was characterized as "good news for women in their 30s...contemplating [a] first pregnancy." (Resnik, R., (Editorial) **New Eng J Med**, 1990, 322:693-94). For helping rid the world of this term, the authors deserve our real gratitude. (Berkowitz, G.S., Skovron, M.L., *et al*, *op cit*, pp. 659-664.) □

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## Bulimia: Who's at Risk?

Bulimia is estimated by the most sophisticated studies to affect one percent of adolescent and young adult women, according to these authors. Though a consensus exists on its prevalence, the reliability of the diagnosis used by most investigators remains open to question. Furthermore, this article raises an interesting issue: has the proper scientific question been pursued? They believe not. More important than prevalence, they believe, is *causation*. Presently, there is little scholarly agreement about the profile of the high risk person by gender, ethnicity, athleticism, body mass, diabetes' presence, or psychiatric disorder. (Fairburn, C.G., and Beglin, S.J. **Am J Psychiatry**, 1990, 147:401-408.) □

## Dengue Fever: A Tropical Disease in the United States

Until recently dengue fever was not found often in the U.S. This disease is characterized by symptoms such as high fever and excruciating muscle and joint pain. Because of the latter pain, it has been called "Breakbone Fever." In 1988, 27 dengue cases occurred, almost all were imported. The causative agent is carried by the mosquito, *aedes aegypti*, which is found in most southeastern and central states. As a result, there is potential for indigenous transmission. (**Morbidity and Mortality Weekly Report**, 1990, 39:127-128, 133.) □

## Quo Vadis?

This irreverent baby boom author states that his urban generation of upwardly mobile types has lost its enchantment with materialism. Under the title, "Next, the Flee Decade" he reports that greed is out, and that escapism is now in vogue.

One wonders where he and his friends will flee, and whether the nation's other social problems and demographic issues will be there too. (Hoffman, P.I., **The New York Times**, Section A, p.29, February 8, 1990.) □

## Hippocratic Oath, Where Art Thou?

It is generally understood that physicians are ethically bound to treat the sick, regardless. As the AIDS virus continues its relentless journey through the human family, many physicians have had second thoughts, according to this study of 2,884 doctors. In response to a statement that a physician was obligated to provide care to a person with HIV-disease, if within his/her proper domain: 19 percent disagreed, 5 percent were unsure. Among specialized surgeons and anesthesiologists, the proportion disagreeing was about 30 percent. Emergency room physicians reported the lowest level of disagreement--8 percent. While the majority of physicians reported attitudes consistent with the Oath of Hippocrates when managing a patient with HIV-disease, a sizable minority, across all specialties, rejected the concept. (Rizzo, J.A., Marder, W.D., and Willke, R.J., **Medical Care**, 1990, 28:251-260.) □

# Deaths From Chronic Obstructive Pulmonary Disease in the United States, 1987

RECAP

***CHRONIC OBSTRUCTIVE PULMONARY DISEASE, 1987***

*Chronic obstructive pulmonary disease and allied conditions (COPD) continue to be the fifth leading cause of U.S. mortality. In 1987 the age-adjusted death rate was 18.7 for the entire country. Rates increased with age and were more than two times higher among men 45 and over than among women. In 1987 the Mountain region led in age-adjusted COPD mortality rates for both sexes--130.2 per 100,000 for men and 66.3 for women. Tobacco smoking is considered the major cause of COPD, and in its absence, COPD would be uncommon. Continued and expanded smoking cessation efforts are needed in an effort to decrease the rate of this largely preventable group of diseases.*

Chronic obstructive pulmonary disease and allied conditions (COPD),* a disease group that rarely makes headlines, caused 78,380 deaths in the United States during 1987. Consistently ranked fifth among the leading causes of U.S. mortality, COPD accounted for nearly 4 percent of the total 2,123,323 deaths across the country in 1987.[1,2]

COPD and allied conditions continue to be the fifth leading cause of death in the United States.

Except for asthma, which accounts for less than 5 percent of the total COPD deaths and usually occurs in younger persons, COPD mortality tends to concentrate in the older ages.[3] The death rates increase dramatically with age and are primarily the result of accumulated years of irreversible lung damage and obstructed air flow in the lungs.[2,3,5]

Tobacco smoking is considered the major cause of most COPD cases.

Tobacco use is considered the major cause of all but asthma among the diseases included in COPD. Longitudinal and cross-sectional studies have documented this fact for years, underscoring the enormous preventive potential associated with most of these progressively debilitating

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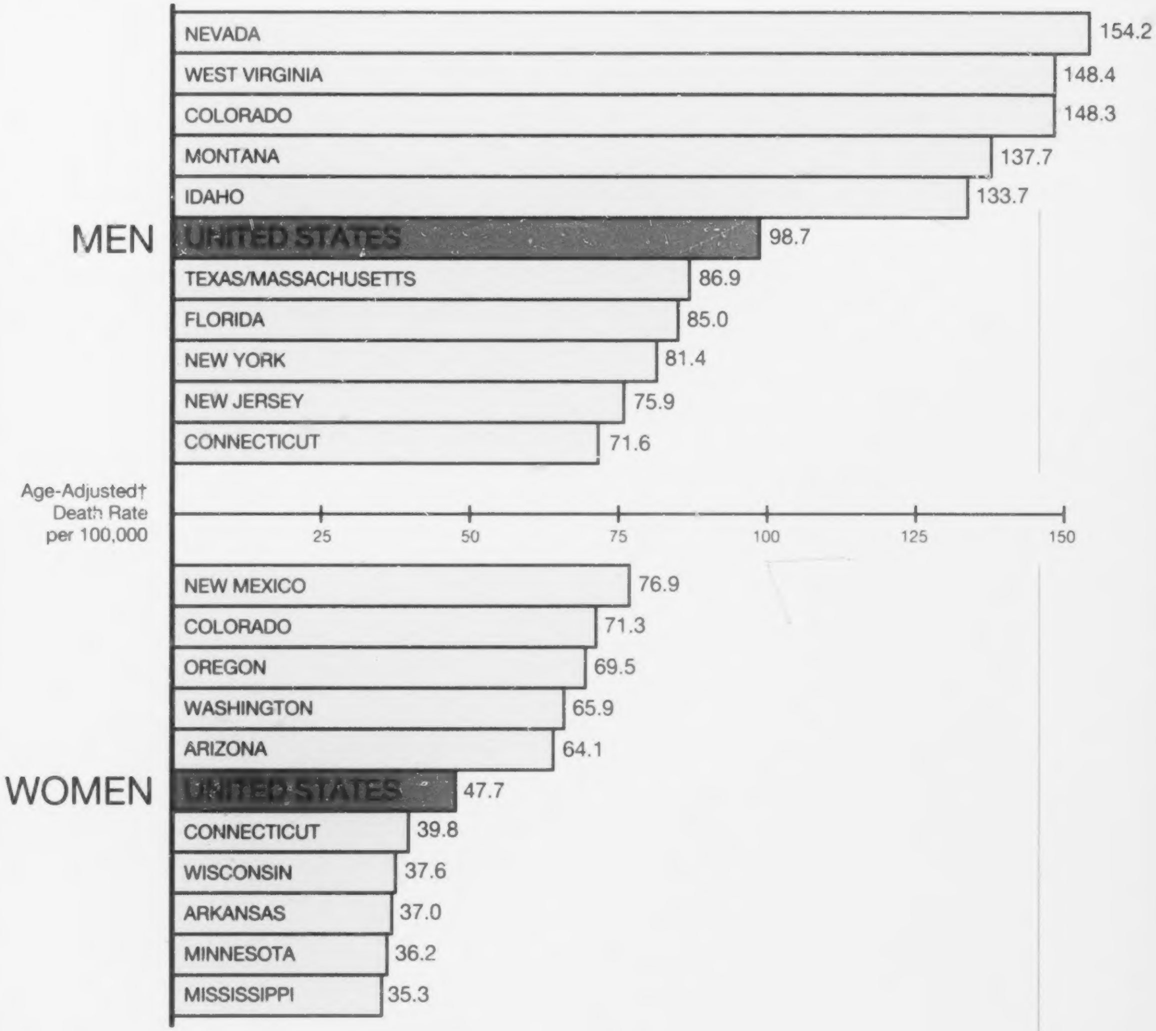
* International Classification of Diseases–Ninth (ICD-9) Codes 490-496.

## States With the Highest and Lowest COPD* Mortality Rates, Population Aged 45 and Over by Sex, United States, 1987



*ICD-9 Codes 490-496.
†Adjusted on basis of age distribution of the U.S. total population, 1940.
Note: Includes states with at least 200 COPD deaths.
Source: Tables 2 and 3.

### Table 1—Trends in Mortality From Chronic Obstructive Pulmonary Disease United States, 1979 to 1987

| | Rate per 100,000 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Age-Adjusted Rate* | | | Crude Rate | | | Number of Deaths |
| Year | Total | Male | Female | Total | Male | Female | |
| 1987 | 18.7 | 26.9 | 13.2 | 32.2 | 39.7 | 25.1 | 78,380 |
| 1986 | 18.8 | 27.6 | 12.8 | 31.8 | 40.1 | 23.8 | 76,559 |
| 1985 | 18.7 | 27.9 | 12.5 | 31.3 | 40.1 | 22.9 | 74,662 |
| 1984 | 17.7 | 27.0 | 11.4 | 29.2 | 38.3 | 20.7 | 69,100 |
| 1983 | 17.4 | 27.0 | 10.9 | 28.3 | 37.9 | 19.2 | 66,246 |
| 1982 | 16.2 | 25.5 | 9.8 | 25.8 | 35.2 | 16.9 | 59,869 |
| 1981 | 16.3 | 26.2 | 9.5 | 25.7 | 35.7 | 16.2 | 58,832 |
| 1980 | 15.9 | 26.1 | 8.9 | 24.7 | 35.1 | 15.0 | 56,050 |
| 1979 | 14.9 | 24.7 | 7.9 | 22.7 | 33.0 | 12.9 | 49,933 |

*Adjusted on basis of age distribution of the U.S. total population, 1940.
Source: Various reports from the National Center for Health Statistics.

lung conditions. Some researchers assert that in the absence of cigarette smoking, COPD would be uncommon in the United States.[3] Research has documented uniform increases in COPD mortality by duration of the smoking habit as well as amount consumed.[5] Daily smokers of 10 cigarettes are known to face a risk of COPD death five times that of nonsmokers, and the risk increases to 20 times among smokers of two packs a day.[4] Further implicating cigarettes in the etiology of most of these diseases are the facts that death rates have "paralleled those for lung cancer" over the years and have increased progressively since the mid-1960s.[3,5] In addition, epidemiologic studies indicate that COPD mortality rates increase with age and that the male:female mortality ratio is 2.04 to 1. Of note is the fact that COPD and suicide are the only two causes of death among the top 15 which are higher among whites than blacks.[2]

In the absence of cigarette smoking, COPD would be uncommon in the United States.

Mortality rates increase with age and are about twice as high in men as women

## Trends

COPD mortality rates have been increasing for both sexes but much more dramatically for women than men, 95 versus 20 percent, respectively, since 1979 (Table 1). In 1979 the crude rate per 100,000 population was 156 percent higher for men than women; in 1987 it was 58 percent higher. Such differences are a reflection of the changes in smoking habits between the sexes over the years. That is, rates of smoking among men and women are becoming more and more alike.

When the data are age-adjusted, the mortality rates are seen to increase at a slightly slower pace than the crude rate.Some fluctuations occurred over the years in the male rates while there were large and steady increases among women.Since 1979 the age-adjusted COPD death rate increased 26 percent for both sexes, combined, primarily due to the 67 percent increase in rate among women; the rate for men increased 9 percent over the years.

## Geographic Variations for Men

Marked geographic variations in mortality rates from COPD exist among men 45 years

## Table 2—Chronic Obstructive Pulmonary Disease* Mortality Among Men Aged 45 and Over, United States, 1987

| | Rank | Rate per 100,000 | | | | | |
|---|---|---|---|---|---|---|---|
| | | 45 and Over† | 45-54 | 55-64 | 65-74 | 75-84 | 85+ |
| UNITED STATES | | 98.7 | 9.7 | 59.1 | 200.3 | 500.7 | 741.4 |
| New England | | 89.4 | 8.7 | 49.6 | 172.4 | 478.1 | 791.5 |
| Maine | 12 | 114.2 | ‡ | 65.4 | 217.1 | [illegible] | 900.0 |
| New Hampshire | 24 | 108.1 | ‡ | 55.8 | 206.3 | 678.6 | 766.7 |
| Vermont | 5 | 138.6 | ‡ | ‡ | 317.6 | 637.5 | ‡ |
| Massachusetts | 43 | 86.9 | 9.0 | 54.8 | 165.5 | 435.6 | 777.3 |
| Rhode Island | 41 | 89.4 | ‡ | ‡ | 213.9 | 518.8 | 600.0 |
| Connecticut | 49 | 71.6 | ‡ | 38.5 | 123.2 | 402.1 | 818.2 |
| Middle Atlantic | | 84.8 | 8.9 | 46.1 | 168.1 | 442.3 | 740.9 |
| New York | 46 | 81.4 | 10.9 | 44.7 | 157.5 | 420.2 | 696.9 |
| New Jersey | 47 | 75.9 | 6.9 | 34.0 | 159.3 | 397.3 | 762.5 |
| Pennsylvania | 35 | 94.3 | 7.0 | 56.0 | 186.3 | 497.4 | 793.2 |
| East North Central | | 101.5 | 10.1 | 58.9 | 208.2 | 510.8 | 798.6 |
| Ohio | 14 | 113.4 | 11.7 | 70.0 | 237.9 | 541.2 | 848.6 |
| Indiana | 13 | 113.9 | 10.4 | 74.0 | 241.9 | 529.9 | 838.9 |
| Illinois | 37 | 92.1 | 11.1 | 51.6 | 184.4 | 477.4 | 686.8 |
| Michigan | 33 | 97.1 | 6.8 | 51.1 | 192.3 | 541.7 | 832.1 |
| Wisconsin | 38 | 91.4 | 10.1 | 48.0 | 188.2 | 455.7 | 840.0 |
| West North Central | | 102.3 | 8.4 | 54.3 | 219.6 | 533.7 | 742.5 |
| Minnesota | 41 | 89.4 | ‡ | 47.1 | 198.5 | 447.8 | 689.5 |
| Iowa | 26 | 102.6 | ‡ | 51.7 | 217.6 | 557.7 | 750.0 |
| Missouri | 21 | 109.5 | 9.9 | 66.1 | 233.1 | 539.5 | 752.4 |
| North Dakota | 29 | 102.2 | ‡ | ‡ | 191.3 | 591.7 | ‡ |
| South Dakota | 34 | 95.4 | ‡ | ‡ | 160.0 | 630.8 | 775.0 |
| Nebraska | 27 | 102.5 | ‡ | 54.4 | 228.8 | 546.4 | 812.5 |
| Kansas | 20 | 109.7 | ‡ | 50.9 | 248.1 | 573.8 | 781.8 |
| South Atlantic | | 98.1 | 10.2 | 66.8 | 198.8 | 466.5 | 680.7 |
| Delaware | 40 | 90.0 | ‡ | ‡ | 128.6 | 600.0 | 1,000.0 |
| Maryland | 36 | 92.2 | 10.4 | 61.6 | 161.4 | 492.2 | 745.5 |
| District of Columbia | 48 | 74.7 | ‡ | ‡ | 126.3 | 337.5 | ‡ |
| Virginia | 30 | 101.6 | 8.5 | 60.2 | 226.6 | 490.9 | 640.0 |
| West Virginia | 2 | 148.4 | ‡ | 113.4 | 282.6 | 696.8 | 957.1 |
| North Carolina | 31 | 101.4 | 10.2 | 66.5 | 223.0 | 465.4 | 588.2 |
| South Carolina | 25 | 107.1 | ‡ | 75.8 | 217.6 | 537.8 | 557.1 |
| Georgia | 11 | 118.1 | 12.7 | 86.8 | 257.4 | 519.7 | 561.5 |
| Florida | 45 | 85.0 | 8.4 | 57.3 | 165.9 | 409.8 | 704.9 |
| East South Central | | 112.9 | 13.9 | 79.7 | 225.4 | 540.1 | 647.1 |
| Kentucky | 8 | 124.4 | 18.0 | 87.5 | 266.7 | 536.4 | 653.8 |
| Tennessee | 16 | 112.0 | 10.3 | 75.2 | 226.6 | 562.9 | 687.5 |
| Alabama | 19 | 110.1 | 15.7 | 80.0 | 196.1 | 560.3 | 684.6 |
| Mississippi | 27 | 102.5 | ‡ | 76.5 | 210.0 | 474.4 | 511.1 |
| West South Central | | 93.3 | 10.2 | 57.8 | 201.6 | 442.2 | 583.1 |
| Arkansas | 17 | 111.3 | 19.3 | 67.0 | 256.7 | 445.5 | 680.0 |
| Louisiana | 39 | 90.4 | ‡ | 59.3 | 193.5 | 419.2 | 550.0 |
| Oklahoma | 18 | 110.3 | 18.9 | 84.6 | 215.4 | 490.4 | 533.3 |
| Texas | 43 | 86.9 | 7.1 | 50.3 | 189.1 | 434.7 | 583.7 |
| Mountain | | 130.2 | 10.0 | 82.0 | 247.7 | 718.2 | 914.3 |
| Montana | 6 | 137.7 | ‡ | 78.8 | 265.5 | 792.3 | 1,033.3 |
| Idaho | [illegible] | 133.7 | ‡ | 97.1 | 242.4 | 686.7 | 833.3 |
| Wyoming | 3 | 148.3 | ‡ | ‡ | 308.3 | 680.0 | ‡ |
| Colorado | 3 | 148.3 | ‡ | 74.6 | 302.4 | 871.4 | 1,012.5 |
| New Mexico | 22 | 109.3 | ‡ | 56.9 | 186.0 | 700.0 | 925.0 |
| Arizona | 9 | 121.1 | ‡ | 87.9 | 217.7 | 633.3 | 850.0 |
| Utah | 15 | 112.7 | ‡ | 59.6 | 239.5 | 600.0 | 825.0 |
| Nevada | 1 | 154.2 | ‡ | 120.5 | 277.8 | 825.0 | ‡ |
| Pacific | | 100.9 | 8.3 | 56.4 | 202.2 | 538.2 | 822.0 |
| Washington | 23 | 109.2 | ‡ | 65.3 | 215.4 | 590.6 | 913.3 |
| Oregon | 10 | 120.1 | ‡ | 77.2 | 248.0 | 621.3 | 745.5 |
| California | 32 | 99.4 | 8.8 | 54.8 | 197.9 | 532.5 | 815.0 |
| Alaska | 50 | 69.7 | ‡ | ‡ | ‡ | ‡ | ‡ |
| Hawaii | 51 | 53.4 | ‡ | ‡ | 120.6 | 218.8 | 666.7 |

* ICD-9 Codes 490-496.

† Adjusted on basis of age distribution of the U.S. total population, 1940.

‡Fewer than 20 deaths; rate not shown.

Source: Vital Statistics of the United States, 1987, Vol. II, Part B.

old and older (Table 2). The 1987* death rate for all U.S. men aged 45 and over was 98.7 per 100,000 population. The lowest COPD mortality was reported in the Middle Atlantic area of the country with a rate of 84.8. In contrast, the Mountain area registered the highest rate, 130.2, which was 32 percent above the national average and almost 54 percent above the lowest Middle Atlantic rate.

Among individual states with at least 200 COPD total deaths, mortality rates for men varied by more than two-fold. That is, during 1987, the COPD death rate was 71.6 per 100,000 in Connecticut but was 154.2 in Nevada. Extremely high rates were also reported in West Virginia and Colorado (148.4 and 148.3, respectively) where the rates were 50 percent higher than the U.S. total. Other states with rates 30 percent or more above the U.S. average were Montana and Idaho (see Figure). After Connecticut, New Jersey experienced the second lowest male COPD mortality with a rate 23 percent lower than the average. New York and Florida followed with rates 18 and 14 percent, respectively, below the average. Texas and Massachusetts were each ranked fifth with identical rates 12 percent below the norm.

Among men, the COPD death rates were the highest in Nevada and the lowest in Connecticut

Nationally, when examined by gender, COPD mortality predominates among men almost 2 to 1. This male predominance increases across age groups and is the most pronounced among persons 85 years old or older.

## Geographic Variations for Women

For women aged 45 and over, the COPD death rate per 100,000 population was 47.7 (52 percent lower than their male counterparts). The highest COPD death rates for women were reported in the Western states (Table 3). The Mountain area reported the highest overall rate, 66.3 per 100,000–a rate 39 percent above the national average. This was followed by the rate for the Pacific states which was 30 percent higher than the norm. As with men, the lowest rate was found in the Middle Atlantic area where the COPD mortality experience was 12 percent lower than that for women in the entire country.

Among women, COPD death rates were highest in New Mexico and lowest in Mississippi.

Among individual states, New Mexico and Colorado reported the two highest female COPD death rates, 76.9 and 71.3 per 100,000, respectively. These rates were 61 and 49 percent higher than the rate for all women 45 years old or older. Oregon, Washington and Arizona followed with rates ranging from 46 to 34 percent above the average (see Figure).

States at the other end of the spectrum with rates more than 20 percent below the norm for women across the country included Mississippi, Minnesota, Arkansas and Wisconsin. Connecticut had the fifth lowest rate for women (39.8) followed directly by the rate in North Carolina (39.9 per 100,000).

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* The latest year for which regional data are available.

# Table 3—Chronic Obstructive Pulmonary Disease* Mortality Among Women Aged 45 and Over, United States, 1987

| | Rank | Rate per 100,000 | | | | | |
|---|---|---|---|---|---|---|---|
| | | 45 and Over† | 45-54 | 55-64 | 65-74 | 75-84 | 85+ |
| UNITED STATES | | 47.7 | 8.3 | 37.1 | 102.0 | 180.5 | 235.2 |
| New England | | 44.3 | 8.2 | 30.6 | 94.5 | 179.3 | 254.4 |
| Maine | 25 | 47.3 | ‡ | 38.6 | 84.0 | 178.1 | 253.8 |
| New Hampshire | 17 | 51.3 | ‡ | ‡ | 133.3 | 170.8 | ‡ |
| Vermont | 8 | 64.9 | ‡ | ‡ | 150.0 | 215.4 | ‡ |
| Massachusetts | 36 | 42.8 | 7.3 | 27.2 | 92.4 | 184.2 | 254.5 |
| Rhode Island | 22 | 48.0 | ‡ | 39.6 | 104.2 | 180.0 | 254.5 |
| Connecticut | 46 | 39.8 | ‡ | 25.6 | 80.3 | 166.7 | 268.8 |
| Middle Atlantic | | 42.1 | 7.2 | 30.1 | 90.4 | 168.8 | 233.7 |
| New York | 35 | 43.3 | 9.5 | 31.9 | 90.1 | 166.0 | 224.6 |
| New Jersey | 44 | 40.5 | 6.0 | 24.8 | 89.7 | 176.6 | 253.0 |
| Pennsylvania | 41 | 41.1 | 4.3 | 30.9 | 91.2 | 168.3 | 236.2 |
| East North Central | | 46.1 | 8.1 | 36.1 | 99.6 | 174.2 | 218.5 |
| Ohio | 24 | 47.4 | 7.7 | 37.1 | 100.0 | 187.8 | 235.8 |
| Indiana | 16 | 52.6 | 12.5 | 40.3 | 124.1 | 161.7 | 182.0 |
| Illinois | 36 | 42.8 | 6.8 | 33.4 | 89.9 | 172.5 | 211.8 |
| Michigan | 20 | 49.6 | 9.0 | 40.8 | 102.2 | 189.5 | 242.3 |
| Wisconsin | 47 | 37.6 | ‡ | 25.9 | 89.8 | 138.6 | 202.0 |
| West North Central | | 44.2 | 7.2 | 40.5 | 92.3 | 155.8 | 187.8 |
| Minnesota | 49 | 36.2 | ‡ | 27.9 | 71.4 | 163.0 | 221.7 |
| Iowa | 38 | 42.6 | ‡ | 38.6 | 81.0 | 149.4 | 182.1 |
| Missouri | 19 | 50.8 | ‡ | 49.6 | 111.8 | 159.1 | 189.1 |
| North Dakota | 51 | 25.9 | ‡ | ‡ | ‡ | ‡ | ‡ |
| South Dakota | 15 | 54.1 | ‡ | 75.0 | 100.0 | 175.0 | ‡ |
| Nebraska | 34 | 43.4 | ‡ | 32.9 | 93.8 | 160.9 | 170.0 |
| Kansas | 27 | 47.0 | ‡ | 41.4 | 105.0 | 155.7 | 186.2 |
| South Atlantic | | 45.9 | 9.7 | 36.7 | 93.1 | 173.7 | 227.7 |
| Delaware | 29 | 44.8 | ‡ | ‡ | 96.2 | 192.9 | ‡ |
| Maryland | 26 | 47.2 | ‡ | 32.3 | 101.2 | 201.1 | 256.3 |
| District of Columbia | 23 | 47.7 | ‡ | ‡ | ‡ | 200.0 | ‡ |
| Virginia | 18 | 51.0 | 10.5 | 39.6 | 102.8 | 203.4 | 246.3 |
| West Virginia | 13 | 59.8 | ‡ | 61.1 | 115.9 | 194.2 | 200.0 |
| North Carolina | 45 | 39.9 | 9.9 | 37.1 | 78.4 | 126.7 | 185.1 |
| South Carolina | 40 | 42.2 | 12.0 | 39.6 | 77.3 | 142.6 | 161.9 |
| Georgia | 30 | 44.5 | 10.5 | 36.8 | 90.4 | 153.2 | 230.0 |
| Florida | 28 | 45.4 | 8.0 | 33.3 | 95.8 | 183.2 | 240.3 |
| East South Central | | 45.0 | 10.3 | 45.3 | 86.3 | 138.7 | 208.1 |
| Kentucky | 14 | 57.1 | 12.6 | 63.2 | 105.3 | 165.9 | 248.4 |
| Tennessee | 30 | 44.5 | 12.2 | 38.5 | 88.1 | 146.3 | 190.0 |
| Alabama | 41 | 41.1 | ‡ | 41.8 | 80.1 | 119.8 | 218.8 |
| Mississippi | 50 | 35.3 | ‡ | 28.8 | 65.7 | 115.6 | 166.7 |
| West South Central | | 43.4 | 8.8 | 37.4 | 92.5 | 147.3 | 179.2 |
| Arkansas | 48 | 37.0 | ‡ | 37.4 | 72.1 | 124.6 | 152.2 |
| Louisiana | 43 | 40.9 | ‡ | 33.5 | 89.6 | 150.0 | 170.0 |
| Oklahoma | 21 | 48.7 | 17.8 | 35.2 | 109.2 | 136.8 | 148.4 |
| Texas | 32 | 44.2 | 7.7 | 38.9 | 93.6 | 154.2 | 196.3 |
| Mountain | | 66.3 | 9.7 | 50.0 | 147.5 | 280.5 | 311.0 |
| Montana | 10 | 62.7 | ‡ | ‡ | 134.4 | 244.4 | ‡ |
| Idaho | 12 | 60.5 | ‡ | 61.1 | 144.4 | 185.7 | ‡ |
| Wyoming | 3 | 74.3 | ‡ | ‡ | 142.9 | 350.0 | ‡ |
| Colorado | 4 | 71.3 | ‡ | 48.0 | 167.7 | 280.7 | 383.6 |
| New Mexico | 2 | 76.9 | ‡ | 68.3 | 142.9 | 333.3 | 355.6 |
| Arizona | 9 | 64.1 | ‡ | 51.2 | 141.0 | 253.3 | 338.4 |
| Utah | 33 | 44.0 | ‡ | ‡ | 104.5 | 169.2 | ‡ |
| Nevada | 1 | 79.5 | ‡ | 51.2 | 191.9 | 318.8 | ‡ |
| Pacific | | 62.0 | 10.3 | 40.7 | 140.1 | 252.0 | 324.9 |
| Washington | 7 | 65.9 | ‡ | 50.6 | 154.1 | 255.6 | 278.4 |
| Oregon | 5 | 69.5 | ‡ | 54.5 | 166.9 | 244.3 | 211.5 |
| California | 11 | 61.2 | 10.4 | 38.9 | 136.8 | 253.4 | 347.2 |
| Alaska | 6 | 68.8 | ‡ | ‡ | ‡ | ‡ | ‡ |
| Hawaii | 39 | 42.4 | ‡ | ‡ | 71.4 | 200.0 | 366.7 |

* ICD-9 Codes 490-496.

† Adjusted on basis of age distribution of the U.S. total population, 1940.

‡ Fewer than 20 deaths; rate not shown.

Source: Vital Statistics of the United States, 1987, Vol. II, Part B.

## Cigarette Smoking

It is well documented that the prevalence of cigarette smoking in the United States has been declining steadily since 1965. Among men 20 years old or older, current cigarette smoking declined from 50 percent in 1965 to 32 percent in 1987; among women the prevalence rate dropped from 32 to 27 percent, respectively.[3] While encouraging, the effects of these improvements in risk factor status are still waiting to be realized, however. Death from COPD is one case in point.

Estimates indicate that more than 80 percent of COPD mortality[*] is attributable to cigarette smoking.[6] While smoking prevalence continues to drop, rates of COPD deaths continue to rise. A probable explanation for this is the long latency period between smoking exposure and mortality from COPD, as well as other tobacco-related diseases. The geographic distribution of COPD deaths versus smoking rates may very well reflect just this phenomenon. That is, persons with tobacco-related lung diseases may migrate to the Mountain or Western areas as well as Florida--migrating away from urban areas with adverse environmental/occupational/behavioral exposures prior to dying from their disease. Such an explanation could partially account for the reported high rates of cigarette usage in urban centers but relatively low rate of COPD deaths as well as high COPD rates in Mountain areas with low cigarette exposures. These apparent inconsistencies may also reflect smoking cessation ratios and mortality patterns from other tobacco-related diseases.[6]

The relatively low rates of COPD deaths among blacks despite the high rates of cigarette usage among this population is also noted. Most researchers speculate that this fact reflects higher and younger death rates from other tobacco-related as well as non-tobacco-related diseases for this group of people.

As prevalence of smoking increased in successive cohorts of women, COPD mortality rates began to approach those of men.[5,6] Today such death rates are unacceptable in this age of preventive medicine, heightened health awareness and consumer responsibility for health. Since more than one in every six deaths in this country continue to be associated with cigarette smoking, it is clear that much work remains before the nation's 1990 objective for smoking prevalence of less than 25 percent is achieved.[7]

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[*] ICD-9 Codes 491, 492 and 496.

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# 1990 Census Estimates

## *RECAP*

### *1990 CENSUS ESTIMATES*

*Demographers have anticipated some of the results of the 1990 Census. MetLife estimates that the U.S. population will total 250.2 million persons. Between 1980 and 1990, as a result of the trend in births since World War II, there was a rapid increase in the number of persons aged 35-44 but a large decline in the total aged 15-24. For virtually all age categories, the relative gains among men outpaced those for women.*

The initial results of the 21st Decennial Census of the United States population, April 1, 1990, will not be released until the end of this year. However, demographers of the Bureau of the Census and Metropolitan Life Insurance Company have prepared estimates based on birth and death records, changes in school enrollments and other vital statistics. Thus, demographers at MetLife calculated that there were about 250.2 million civilians and members of the Armed Forces residing in the United States on Census Day.

> There were about 250.2 million civilians and members of the Armed Forces residing in the United States on Census Day

Figure A presents the trend in resident population growth in the U.S. since 1790. As can be determined, approximately the same absolute number of persons were added to the population in each decade since 1960. The April 1, 1990 count represents a gain over the previous tabulation of almost 24 million persons, or slightly more than the increment during the 1970s but somewhat less than that between 1960 and 1970. The record decennial gain of 28 million occurred during the 1950s. On a relative basis, the population increase between 1980 and 1990 amounted to 10.5 percent. This percentage gain represented the second smallest decennial rise in U.S. history; it only surpassed the 7.3 percent gain during the Depression years of the 1930s.

## Age Details

When the Bureau of the Census releases the 1990 results, they will confirm the gradual aging of the population and the continued regional shifts. Anticipating these findings, their demographers have projected that the median age of the resident population will be 33 years in 1990 compared with 30 years in 1980.[1] If this proves to be true, this increase would be the largest increment since the 3.5-year gain between 1930 and 1940.[2] They also forecast that the median age will be 34.5 years in the Northeast; 32.9 years in the Midwest and South and 32.3 years in the West.[3] The trends in median age of the U.S. population, as well as other broad demographics, have been fully presented in an earlier *Statistical Bulletin* article.[4] Examining MetLife's estimates of the age and sex profile of the population, shown in Figure B, it can be seen that persons aged 35-44 were the fastest growing age group in the past 10 years.

> Persons aged 35-44 were the fastest growing age group in the past 10 years.

The number of men and women at these ages increased by nearly half to about 37.4 million and are now the second most populous group in the country. These people were born in the beginning of the Baby Boom years (1946-1955) while those

## Census Purpose and Mandate

The nation has had a sizable stake in an accurate and complete census. The 1990 Census was the latest in an unbroken series of counts since 1790 of every person living in this country or temporarily abroad on Census Day--and of every housing unit. Also included were the inhabitants of Puerto Rico, the Virgin Islands, Guam, American Samoa and the Trust Territory of the Pacific Islands.

The Bureau's task is defined by Article 1, Section 2 of the U.S. Constitution, which states "[An] enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent Term of Ten years, in such manner as [Congress] shall by Law direct."

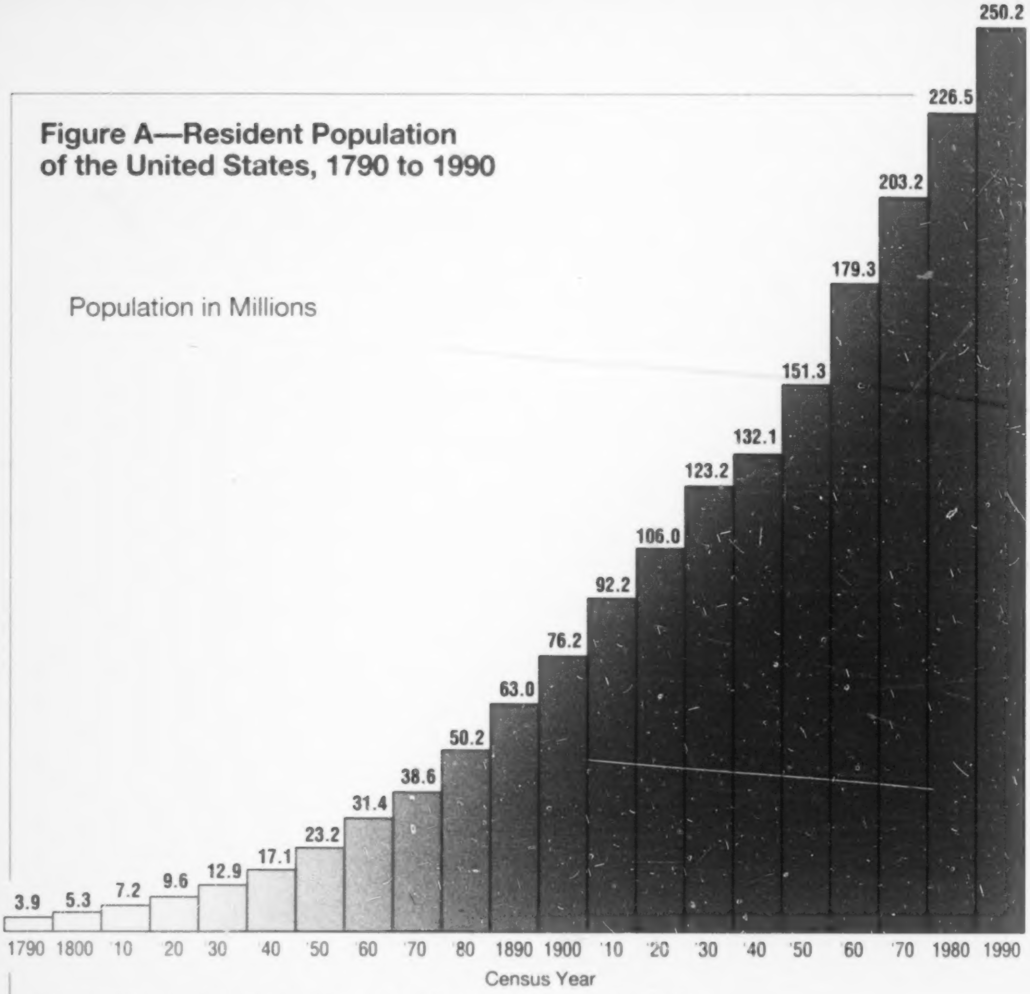
### Deadlines

The Census Bureau must deliver the state population counts to the President no later than December 31, 1990. Additionally, by April 1, 1991, the Bureau must make available to each state government the population totals for all counties, cities and other political subdivisions. This information will be used for regional planning, the reapportionment of state legislatures, the redrawing of local, district and ward boundaries in accord with the one-person, one-vote principle, and distributing government funds.

### A Complete Count

Unfortunately, many persons, for various reasons, have not participated in past counts. These people include the very poor, the homeless, and illegal aliens who may be afraid of discovery and deportation. Federal law strictly protects the confidential nature of the information collected from the census. In an effort to allay the fears of such persons, the Census Bureau has extensively advertised in 1990 to underscore the privacy of individual census answers. It is historically noteworthy that no census employee has ever been charged with violating this trust. □

**Figure A—Resident Population of the United States, 1790 to 1990**



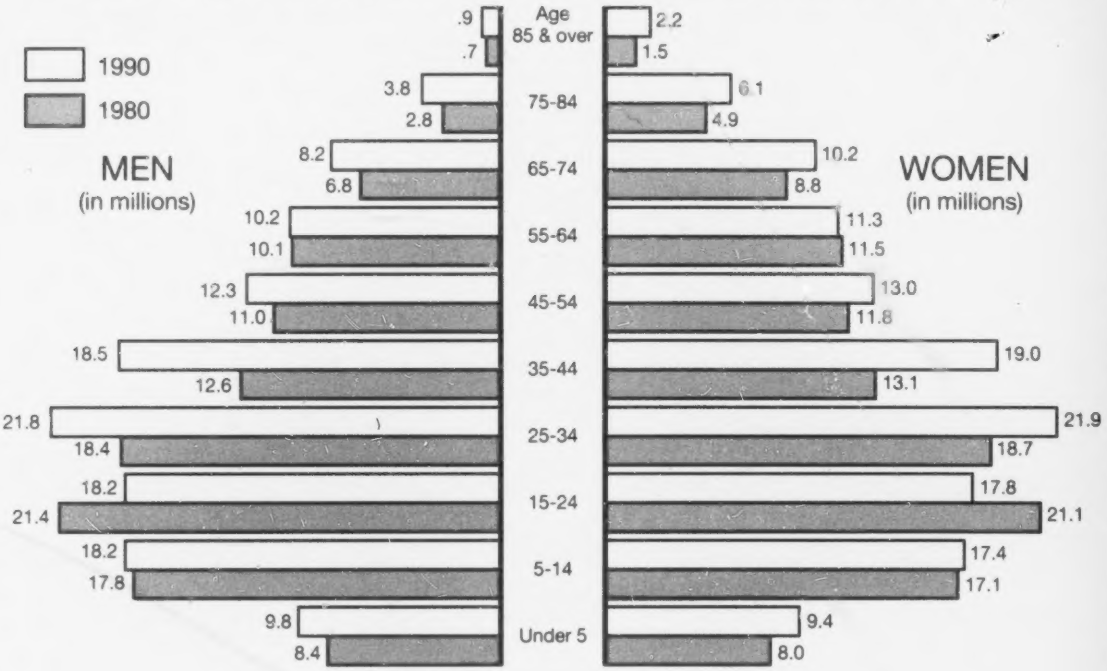
Source: 1980 and prior data from the Bureau of the Census, 1980 Census of Population, PC80-1-B1; 1990 from the Health and Safety Education Division of the Metropolitan Life Insurance Company.

born during the latter part of the post World War II birth explosion (1956-65) are now in the 25-34 age category and comprise the most numerous population group--about 43.7 million. Numbers of both men and women in the 25-34 age bracket increased by roughly one-fifth in the past 10 years, with the gain among men somewhat outpacing that for women. Compared with the relative increase among persons 25-34, the decennial increase for boys and girls under five years of age was fractionally smaller. During the 1980-1990 period, the percentage rise among persons aged 45-54 was approximately the same magnitude as the countrywide increase of 10.5 percent.

## Ages 65 and Older

The relative population gain among persons aged 65 and over far outpaced the United States average of 10.5 percent. For instance, the number of persons 65-74 years of age rose by roughly one-fifth between 1980 and 1990, with the rise among women being slightly smaller than that for men. This was also the case in the next older bracket (ages 75-84), but for both sexes the

Figure B—Resident Population and Percentage Change by Age and Sex, United

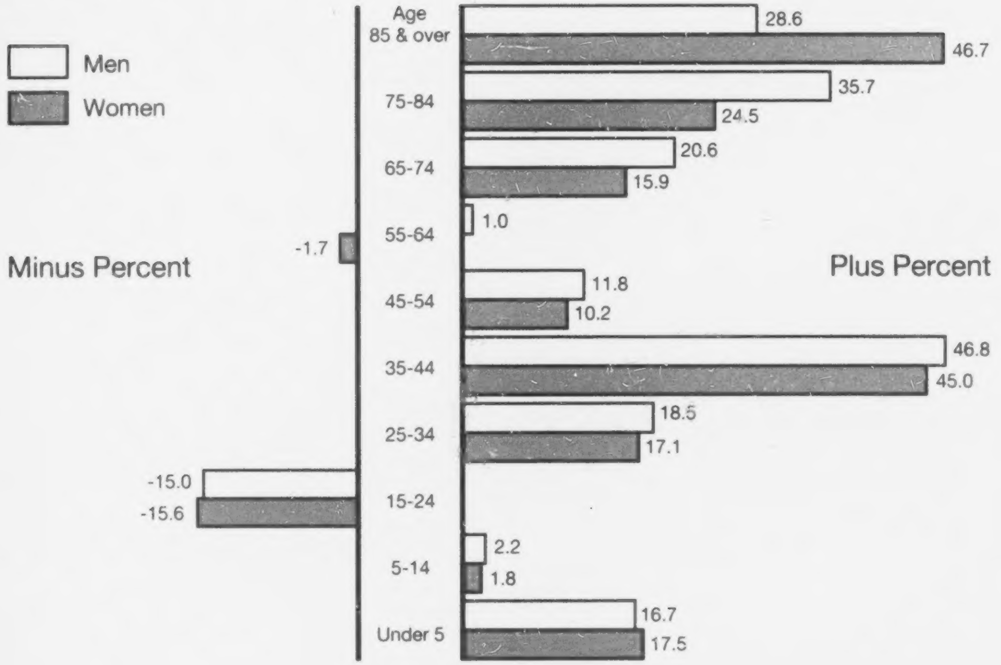


relative increases were significantly greater than that for persons 10 years younger. Analysis of the population change among persons aged 85 and over revealed a different outcome.In this category, the percentage increase among women was larger than that among men, specifically 37.5 percent compared with 28.6 percent. If these estimates are confirmed by the 1990 Census, the 85 and over age category will be the only one in which the relative gain for women outpaced that for men.

State population counts vary more than national totals.

Continued examination of Figure B reveals some other noteworthy occurrences. Most dramatic was the substantial decline in the count of young men and women aged 15-24. For each sex, the relative numbers decreased by about 15 percent; combined, their 1990 total amounted to 36 million or 5.5 million less than in 1980. The precipitous decline of persons aged 15-24 was caused by the sharp difference in the number of babies born between 1956-65 (boom years) and 1966-75 (baby dearth). Also, very little increase occurred in the number of children aged 5-14.In addition, among persons aged 55-64, men hardly experienced any population gain during the decade while the number of their female counterparts declined slightly. □

**tates, 1980 to 1990**



Source: Bureau of the Census, Current Population Reports, Series P-25, No. 1045; 1990 from the Health and Safety Education Division of the Metropolitan Life Insurance Company.

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## Regional U.S. Population Change

**Geographically during the past decade, Western states, on the average, continued to grow fastest. Southern states were next and also the most populous. On the other hand, the Northeast now has the least population since it was surpassed by the Western region.**

**State population counts vary more than national totals. However, some 1990 census results are assured. For instance, California will have the most residents with nearly 30 million. Texas, growing rapidly, has almost overtaken New York. Florida has experienced very rapid growth, to near 13 million. Further details regarding individual state populations were published in a previous *Statistical Bulletin*.[4] ☐**

# STATISTICAL INFORMATION, PLEASE

**Q** ***Do the leading causes of death in the U.S. 50 years ago still exist as major public health problems?***

**A** In 1940 the five leading causes of death (and their percentage of total deaths) were: heart disease (27.2%), cancer (11.2%), stroke (8.4%), nephritis (all forms, 7.6%), and accidents (6.8%; with motor vehicle, 2.4%).

In 1987 (the most recent year for which complete data are available) these same causes of death were: heart disease (35.8%), cancer (22.5%), stroke (7.1%), nephritis, nephrotic syndrome and nephrosis (1.0%), and accidents (4.5%; with motor vehicle, 2.3%).

In 1940 deaths assigned to the five leading causes accounted for 61 percent of the total number of deaths. By 1987 these same causes were responsible for 71 percent, although nephritis, nephrotic syndrome and nephrosis had dropped to 11th position. Currently, chronic obstructive pulmonary disease and allied conditions rank fifth among the causes of death.

* * *

**Q** ***What are the demographic characteristics of persons dying from heart disease in the United States?***

**A** In 1986, 765,490 deaths were assigned to heart disease, accounting for 36 percent of all deaths in the nation and making it the leading cause of death for both men and women. A report* published by the National Center for Health Statistics, with estimates from the National Mortality Followback Survey, presented the following characteristics of persons who died from heart disease in 1986:

- Elderly persons 75 and older accounted for the majority of heart disease deaths – 431,570 (57 percent).
- A larger number of men died from heart disease at earlier ages. For ages 25-64, there was an estimated 10,914 (27 percent) of men vs. 3,845 (11 percent) of women.
- By marital status, equal proportions of deaths were among married or widowed persons – over 40 percent. About 8 percent had never married.
- Over 50 percent of these deaths occurred in those with less than a high school education; one-fourth had completed high school and less than one-fifth had attended college.
- There were 67,650 (17 percent) employed men vs. 13,240 (4 percent) women at time of death.
- "Blue collar" occupations were the most frequently mentioned for men with heart-related deaths. Among women, the majority were in technical, sales or service occupations.
- In 1985, the year prior to death, half of the men had lived with a relative. Almost one-third of the women had lived alone or with unrelated persons, and another 22 percent had lived in a nursing home, health facility or institution.
- 53 percent of the women had a family income of less than $9,000 in 1985 vs. 35 percent of the men.

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* "Characteristics of Persons Dying of Diseases of Heart. Preliminary Data from the 1986 National Mortality Followback Survey." *Advance Data No. 172.* DHHS Publication No. (PHS)89-1250.

Please send your questions to:

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New York, N.Y. 10010-3690

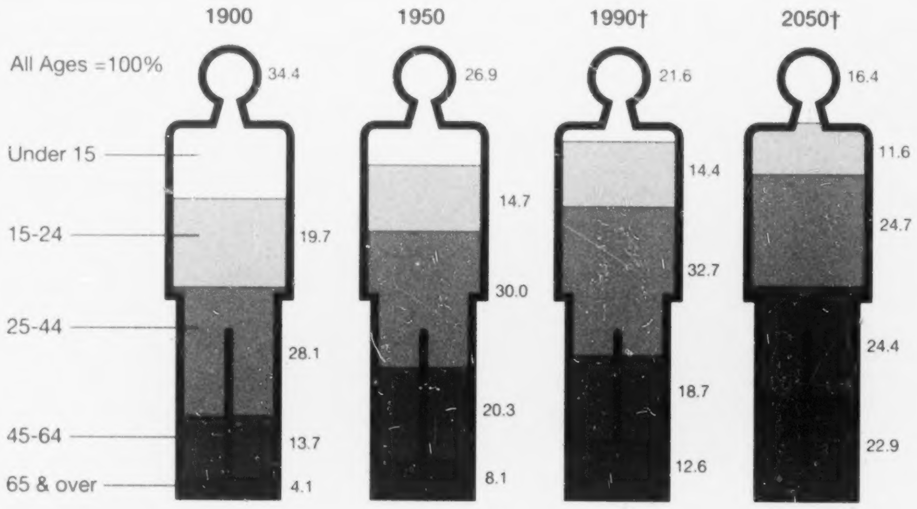
# Historical Perspectives

## U.S. Population Distribution by Age
## 1900, 1950, 1990 and 2050

(Numbers in Thousands)

| Age | Census |  | July 1 |  |
|---|---|---|---|---|
|  | 1900 | 1950 | 1990† | 2050† |
| All Ages | 76,212* | 151,326 | 250,409 | 299,847 |
| Under 15 | 26,171 | 40,673 | 54,070 | 49,420 |
| 15-24 | 14,930 | 22,221 | 36,107 | 34,754 |
| 25-44 | 21,386 | 45,413 | 81,822 | 74,043 |
| 45-64 | 10,422 | 30,724 | 46,851 | 73,098 |
| 65 & over | 3,085 | 12,295 | 31,559 | 68,532 |

Percent Distribution



* Includes "Not reported."
† Includes Armed Forces Overseas.
Source: U.S. Bureau of the Census.

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